WP4 Case study Report

INFORSE

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Executive Summary

The INFORSE case consists of an analysis of the transnational network INFORSE (International Network for Sustainable Energy), the Danish local initiative VE and the Belgian local initiative APERe. All three are dealing with renewable energy and energy savings. The link between INFORSE and VE is strong, whereas there is almost no contact between INFORSE and its Belgian member APERe. The three parts are summarised in the following. This is followed by a short summarising conclusion concering what we learn about how social innovation interacts with other forms of transformative change from the INFORSE case.

Summary for the transnational network

The transnational network INFORSE is a network of NGOs dealing with renewable energy. The global network consists of regional networks; one of these regional networks is INFORSE Europe. One of its main activities is lobbying in relation to renewable energy, and therefore the network participates in various different global meetings such as Climate COPs, and produce hearing statements for EU public consultations on energy policy and strategy. Two main findings from the INFORSE part of the case are worth mentioning:

Facilitating role

In discussing INFORSE's relation to aspects of innovation and change, it was clear that due to the difficulties of identifying INFORSE's actual involvement in projects, pinning down its relation to innovation and change becomes difficult. However, is clear is that INFORSE has had a facilitating role through hosting a database of the members' contact details so that the members have a way to identify and contact each other. The contact lists took up considerable space in the early editions of INFORSE's newsletter Sustainable Energy News before the Internet was in widespread use. In this way, INFORSE's relation to innovation and change is not so much related directly to actual innovations (be it social or technical) but rather related through a facilitating role creating the necessary links for certain projects of the member organisations to happen. INFORSE Europe has developed an energy vision guidance material, to be used by the member organisations for developing their own national energy visions.

Funding

One of the main things directing INFORSE's work is how to obtain funding. When studying their history in detail, it can be seen that a necessary precondition for many of their activities has been that they could in some way get financial support for it. Hence, their work has been, to some degree, controlled by their access to funds, and a clear turning point for INFORSE was the loss of support in 2002 from the Danish government which required them to find new sources of funding, that have often been more tied to a specific project than to the organisation in general, as the Danish government support was (interview with Gunnar Boye Olesen 13th October 2014).

Today the INFORSE network is an example of a relatively 'thin' transnational network that connects organisations but does not do much more in terms of activities involving the organisations – unless the organisations contact INFORSE themselves. It is as such a network that hosts opportunities for the member organisations to start up projects or activities but it requires the member organisations to take the initiative. INFORSE's lobbying activities do not involve the

member organisations although INFORSE represents the member organisations, and these lobbying activities cannot be defined as social innovation.

Summary for the Danish case

The Danish local initiative is VE – Vedvarende Energi (directly translated into 'Renewable Energy', however the organization names itself Sustainable Energy in English). The organization started in 1975 under the name OVE – Organisationen for Vedvarende Energi (Organisation for Renewable Energy) – with the objective to support the change of the Danish energy system to be 100 % renewable energy, demonstrating the alternatives to fossil fuels and nuclear power. At the same time energy efficiency and changed energy behaviour would be advocated for. At first sight, VE has been occupied with technological invention and innovation, but looking closer into the history examples of true **socio-technical** character of the innovation processes becomes clear.

VE is an important part of creating an environment that could be called **an ecology of innovation network** (Nicholls and Murdoch 2012). This environment – and social innovative ways of collaboration - is essential in relation to the actual development of renewable energy technologies, especially the development of wind turbines (Karnøe and Garud 2012). Here you can talk about a co-evolution of technologies and social environment – the environment attracts people who are interested in developing the technology, especially in the 1970ies and 1980ies. It is also the basis for the development of new ways of organizing and financing renewable energy projects, for instance via wind turbine cooperatives in the 1980ies and the beginning of the 1990ies. Apart from demonstrating that the different renewable energy technologies actually worked in practice, VE has taken part in developing alternative energy plans for Denmark, illustrating that it is possible to base society on 100 % renewable energy, if renewable energy is combined with energy efficiency. VE has experimented with different ways of involving citizens in energy savings in their homes, especially through the local environment and energy offices that are related to VE

The way that VE is socially innovative changes over time. Some of the processes centered around inventing technology became less important in the environment as industry gradually took over for example the production of wind turbines. This can be seen as a part of the **mainstreaming** process – **upscaling** the technology and production, but at the same time putting some of the social innovation in the background, while normal capitalist societal mechanisms took over. . Other renewable energy technologies have not developed in the same way in Denmark – neither solar energy nor bio-gas has become big industries in Denmark (Karnøe and Garud 2012). The way VE is working with energy savings in individual households are still based on the same grass root activities as earlier – it has not been mainstreamed in the same way as wind turbine production

The question about renewable energy in the energy system has been mainstreamed – from being highly controversial and considered almost ridiculous, it is now very difficult for people to say that they are against renewable energy in Denmark. The question of energy savings has at least partly been mainstreamed and included in legislation. VE as an organization has been professionalized to some extent, but it is not mainstreamed in the same way as the Belgian APERe. VE is to a high degree depending on projects for funding, not receiving any basic grant (to activities in Denmark) from public authorities. VE has however been part of a co-creation process securing funding for small projects and experiments. Now VE is trying to '**de-mainstream'** itself, returning to basics: more focus on sustainability, democracy and local projects. In relation to wind co-operatives it might be a question of **downscaling** the projects in order to get more of them.

A number of different **new organisations and institutions** related to renewable energy have been fostered by VE in its 40 years of existence, with differences in how closely they are linked to VE. Creating new organisations can be seen as a social innovation process related to the informal network in the environment.

The energy system in Denmark has been transformed towards more renewable energy during the last 40 years. VE describes its role in this process as being a part of a larger movement that made the transformation happen. Some of the changes are, however, contested by other NGO's, and some see the lack of large reductions in energy use as a missed opportunity. The development can be described as a continuous navigation process. Constantly the organisation has to manoeuvre trying to figure out how it can influence the transformation to a 100 % renewable Denmark in what the organisation finds the best way. It is a constant manoeuvring in relation to other actors; in relation to conflicts; in relation to opportunities and in relation to the development of the energy system.

Summary for the Belgian case:

The Belgian local initiative investigated is APERe (*Association pour la Promotion des Energies Renouvelables*), an association of social economy created in 1991 with the objective of promoting renewable energy and rational use of energy. We can summarize our main results through three themes.

Firstly, considering INFORSE **an ecology of innovation network** (Nicholls and Murdoch, 2012, p.35), i.e. a global network to which various subnetworks subscribe and which itself forms of a broader field of renewable energy innovation, we can nevertheless question the existence of direct links between the international network – here INFORSE – and the local initiative – here APERe. Possibly unlike other TRANSIT cases where affiliation of the local initiative to the international network is more obvious, interactions between APERe and INFORSE Europe, based in Denmark and active at the European level, are very loose even if they share similar goals and visions of the energy transition. In practice, for defining strategies, planning activities and implementing concrete projects, APERe is more connected to local organisations in Belgium, especially in Wallonia and Brussels.
In this regard, a very important characteristic of the case is related to the institutional context of Belgium, i.e. its federal structure where energy policy is very regionalised (Regions being federated entities with their own competencies). Hence, organisations in the energy sector are shaped by this regional division and this explains why APERe is mainly active at the Walloon and Brussels levels and (only) a little at the federal scale.

Secondly, in terms of **upscaling**, which is theorized to be an important TSI challenge in our TSI proto-theory, we can establish a very strong evolution of APERe towards institutionalization and mainstreaming. This evolution has resulted from formal interactions with "insiders" in the energy sector, which allowed quite fast resourcing and professionalization of the organisation. This strategy of making alliances with regime actors was pursued since the beginning of APERe, in order to give credibility to renewable energy and energy savings and influence the institutional framework in favour of those. This position has not changed over time, not only because APERe is satisfied with the way in which its activities have been developed but also because formal relationships with regime actors – especially public authorities – have become a precondition to finance the APERe's staff through subsidies and remuneration of services.

However, APERe also maintains network relations with the more radical fringes – or outsiders – of the renewable energy movement, in particular citizens cooperatives with which they share common values (e.g. decentralization of energy production, empowerment of citizens).
To play in this complex multi-actor network, APERe positions itself as far as possible as a neutral expert so as to gain legitimacy for their opinion and activities, even if they are in favour of transformative changes (a society of 100% renewable energy, also implying significant reductions of energy consumption).

Thirdly, the case exemplifies how (transformative) social innovation tends to form part of broader processes of **socio-technical change** (as theorized in transitions studies, but see also Schubert 2014, for example). Probably in contrast with other TRANSIT cases, the INFORSE case is characterised by a strong technological focus with a less obvious dimension of social innovation. However, APERe has always advocated changes in governance and in societal model. This kind of transformative discourse is more and more explicit, as well as the support to grassroots innovation such as citizen renewable energy cooperatives. The origins of the organisation in a cooperation development NGO and an environmental NGO reveal how APERe was shaped by ideas and values extending well beyond the technological energy issues alone. In this respect it is telling how the Charter of APERe deploys the term of "sustainable energy", which expresses the different technological (development of renewable energy, energy efficiency) and social dimensions (changes in demand of energy services, in the way energy is supplied, etc.) of the energy transition. In fact, APERe can be seen to occupy a certain middle ground between surrounding actors in their 'ecology of innovations': they find themselves amidst strongly technically oriented (EDORA, energy regulators, administrations) and strongly socially oriented actors (Inter-environnement Wallonie, REScoop).

Conclusion

What do we learn about how social innovation interacts with other forms of transformative change from the INFORSE case? INFORSE as a global organisation and the two local initiatives have – in different ways - been involved in the transformative change of the energy sector. The Danish case is covering a period of 40 years and illustrates different kinds of dynamics in the relation between the social innovations, system innovations and societal change. In the early days of the case, creation of informal networks, experiments with new collaborations and new technologies are important for the development, having a very clear socio-technical nature. Networks of actors develop technology and this process is a part of developing the networks, which can be considered an ecology of innovation networks, a bricolage of distributed agency. The networks have not only been experimenting with new technologies, but also with new ways of organising ownership, new ways of financing, new ways of involving people – which all can be said to be social innovations. Due to the loose, informal structure and the many different actors, it is difficult to identify the exact impact of the different social innovations on the system innovation and societal change. Several people, both inside and outside VE, claim that VE has played a role in relation to the change in the Danish energy system.

The case study also makes it quite clear that funding is a necessity, and funding predominantly are coming from public related agencies, often related to specific projects. It is necessary to nurture the informal environment in order to maintain and develop the networks and support the experiments.

It is interesting to notice that even though the Danish case can be seen as a success story in relation to the change of the Danish energy system, there are still contested areas in relation the transition towards sustainable energy. Different NGOs argue that VE should be more cautious in relation to

bio-energy. Others point to the slow pace in which energy savings are introduced. Both the Belgian and the Danish case make it clear that the organisations find it easier to promote renewable energy than an altered energy behaviour.

1 Introduction to *THE INFORSE CASE*

The INFORSE case consists of an analysis of the transnational network INFORSE (International Network for Sustainable Energy) , the Danish local initiative VE and the Belgian local initiative APERe. All three are dealing with renewable energy and energy savings. The link between INFORSE and VE is strong, whereas there is almost no contact between INFORSE and its Belgian member APERe.

The INFORSE case, through its focus on sustainable energy, poses an example of transformative social innovation in the energy sector. The case shows how concerns over unsustainable energy production have given rise to social innovation worldwide. This social innovation typically involves, first, resistance against fossil fuel-based and nuclear energy. As the basis for the current worldwide network was laid in Denmark, around 40 years ago, the plans towards the establishment of a nuclear energy sector evoked a counter-movement. Second, actions related to the INFORSE case typically involves the active promotion and development of alternative ways of energy production, the boosting of renewable energy. In the Danish case, there is even an intial co-evolution of the social networks, the cooperating grass roots and the technological development. Third, this has often been accompanied by action on the energy consumption side as well, advocating less energy-intensive practices and energy efficiency as strategies towards an overall decrease in energy consumption. Considering these goals, all implying attempts to break away from what has been described elsewhere as the 'energy regime' (Verbong et al. 2012), INFORSE can be considered a clear case of Transformative Social Innovation (Haxeltine et al. 2013).

It is not that obvious to consider INFORSE as a TSI case, though. INFORSE displays three particularly interesting characteristics that will be highlighted in this case study.

1) **Mainstreaming.** Even when INFORSE, and its manifestations in Denmark and Belgium, can be traced back to quite revolutionary initiatives from 'outsiders', this can be seen to have changed. Local initiatives have joined forces in global networks, and a renewable energy sector has emerged as a formalized, consolidated structure that in a way may even have ceased to be 'social innovation', even though there are differences between the local initiatives. The INFORSE case thus shows how social innovation in energy has – at least partly - institutionalized over the years, and this raises pertinent issues to transformative social innovation more broadly: How does this institutionalization consolidate its transformative potentials? To what extent has it involved cooptation, domestication and stifling of transformative potentials? And what made the mainstreaming, the normalization of renewable energy question, possible in the first place? In relation to this it is important to realize that some parts of the field have been mainstreamed, others are less mainstreamed, and the Danish local initiative is in a process of de-mainstreaming itself.
2) **Socio-technical change.** At first sight it may appear that INFORSE and its sub-networks aren't really occupied with social innovation, but rather with technological innovation. On the other hand, one can consider how even innovation that seems to be exclusively technological in nature tends to presuppose a degree of new practices to have the new technologies 'fit in' somehow (Akrich 1992; Ornetzeder 2001; Maruyama et al. 2007). In that respect INFORSE sheds further light on the role of social innovation on this socio-technical spectrum. In particular, considering the mainstreaming mentioned above, INFORSE brings further insights

on the process of social innovation receding into the background over time, as a side-effect of mainstreaming (Jensen et al. 2012).

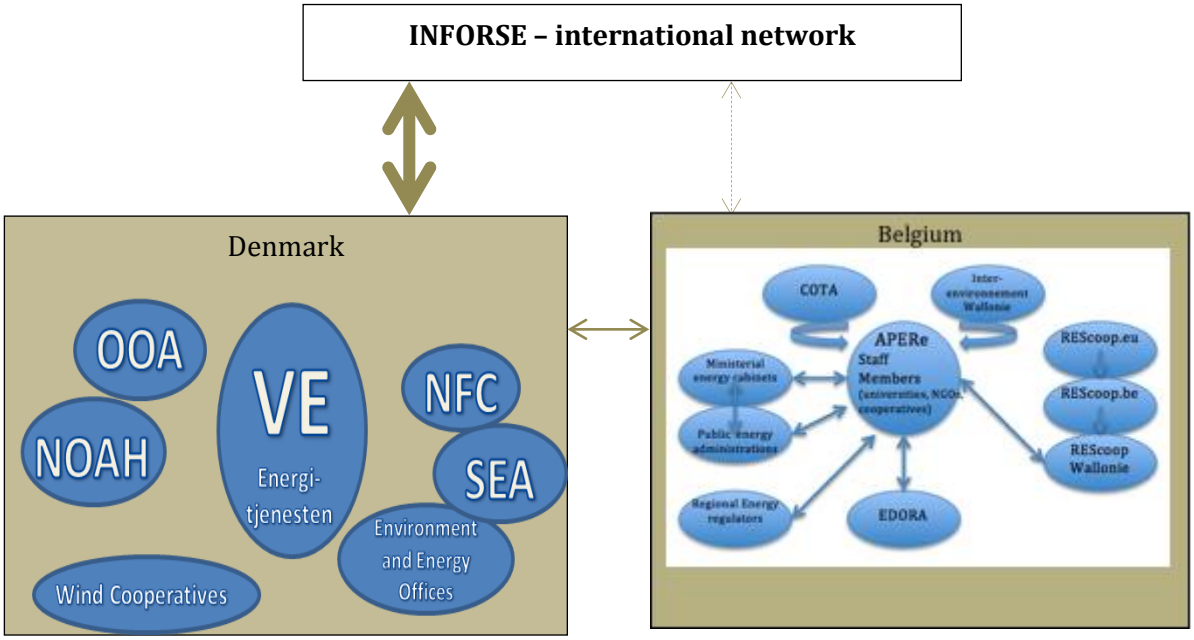
3) **Ecologies of innovation networks.** INFORSE, as a global network to which various subnetworks subscribe, is nearly impossible to pin down as a unit. As a very loosely structured network, it contains a great variety of sub-networks that themselves also branch in various ways. INFORSE can be considered an ecology of innovation networks (Nicholls & Murdoch 2012:35). Other than focusing on the 'organigram' of INFORSE, i.e. on the most visible and the most institutionalized local manifestations in isolation, it is therefore considered how multiple local manifestations interact – studying the evolution of transformative change, it is the multiplicity of innovations that needs to be observed (Schot & Geels 2008; Pel 2014). Further considering the mainstreaming process INFORSE has been undergoing, it is most interesting to see how the relatively mature and institutionalized parts of the network interact with the somewhat more radical, less formalized innovators that surround them. The latter may not be official INFORSE members, whilst at least sharing some of its spirit and objectives. The INFORSE case illustrates how the local initiatives both have fostered new organisations that become part of the larger informal innovation network.

    a. The local initiatives in focus: outline the names and the locations of the two initiatives

Denmark: the Danish local initiative is VE – 'VedvarendeEnergi' (Renewable Energy). The organisation has been important in relation to establishing INFORSE as a transnational network. VE and INFORSE are located in the same office in Århus, the second-largest town in Denmark. The organisation is a merge between OVE, a Danish national NGO for renewable energy, and SEK, an umbrella for a number of local Environment and Energy Offices – which are local NGOs working with renewable energy, energy efficiency and changed energy behaviour. VE is also represented locally by 'Energitjenesten', often more or less merged with the local Environment and Energy Offices. 'Energitjenesten' is a non-profit, independent organisation, providing advice on energy savings and renewable energy to private persons. VE was and still is to some degree part of a large informal network of Danish NGOs, an environment from which much change is inspired. Other important NGOs in this network were OOA – 'Organisationen til Oplysning om Atomkraft' (The Danish anti-nuclear movement, which closed 31st of May 2000) and NOAH – now the Danish member of Friends of the Earth International. Related to VE and INFORSE is NFC – 'Nordvestjysk Folkecenter for Vedvarende Energi', the Nordic Folkecenter for Renewable Energy. VE has also relations to Samsø Energy Acedemy, established in 2007. VE has relations to different forms of renewable energy cooperatives. The wind co-operatives are also represented in the organisation of Danish Wind Turbine owners – there are, however, no separate organisation of Danish wind co-operatives, hence the Danish Wind Turbine Owners Association also represents private developers.

Belgium: As indicated, the challenge of studying a widely dispersed and chequered network is taken up by focusing on the interactions between the more and less mainstreamed parts of INFORSE – which includes innovation activities in sustainable/renewable energies beyond official membership. Still, focused investigation requires some more specific case demarcations. For the Belgian part of the case, the choice has been to focus on APERe, the "*Association de promotion des énergies renouvelables*". This is the francophone INFORSE subnetwork, covering Walloon and Brussels areas. Whereas INFORSE Europe is more active in lobbying, APERe is more 'hands-on', i.e. more involved in concrete projects, and they don't have the capacity available to follow the complexity of EU politics. Furthermore, the case traces relations between APERe and EDORA (the Walloon professional federation of the renewable energy sector), REScoop Belgium and Wallonia

(the federations of renewable energy citizens' cooperatives) and other organisations surrounding APERe.



2 Methodology

2.1 Researcher relations to the case

Denmark
Four different researchers have been involved in the empirical research. Morten Elle has been a member of VE via the VE related organisation Copenhagen Environment and Energy office (KMEK) since 1994, and a member of the board of KMEK from 1996 to 2006. Henriette Kjær Aagaard is not related to VE in any way. Michael Søgaard Jørgensen has been part of developing the case. He has been part of the advisory board of VE's recent energy vision project. Furthermore, VE has participated in research workshop about energy visions organised by AAU.

Belgium
During our empirical research, the Belgian researchers Valentine van Gameren and Bonno Pel adopted a distant position vis-à-vis the interviewees and the organisations researched. This position was fairly easy to maintain as the researchers were not members nor informally involved sympathizers of any of these organisations. No connections with the innovation network existed before the research, except for the current General Secretary of APERe who is Professor in Université Libre de Bruxelles. The other interviewees were approached by e-mail or by phone. This distanced and independent position allowed us to perform a critical analysis of the initiative and the dynamics of its surrounding innovation network.

2.2 Methods

2.2.1 Overall methodology

Denmark
The Danish local initiative VE has a long history, and it is evident that VE is a part of a larger grass root environment. Even though VE is at the centre of our research, it has been important to study other parts of the environment as well, especially local environment and energy offices. There has been a development in how VE and associated organisations engaged with different types of social innovations, hence we have been looking for sources: documents, literature and interview persons that could contribute to the description of this development. During our research it has become clear that it is often difficult to distinguish between the different elements in the environment, especially as many people have been associated with several of the organisations. One example relates to Gunnar Boye Olesen – sometimes it is difficult to say whether he acts as regional coordinator of INFORSE or policy spokesperson of VE.

Furthermore, we have tried to reach the European INFORSE members by an e-mail based short questionnaire. The questionnaire was sent to more than 30 member organisations, but only one member organisation replied.

Belgium

As indicated and visualized in the introduction, the notion of 'local initiatives' has been interpreted to refer to an ecology of innovations. As a consequence of this, the approach is one of network analysis and 'snowballing', focusing on APERe yet with the particular aim of tracing its relations with 1. surrounding innovations and networks of which some have been identified upfront and 2. INFORSE Europe/internationally. It has been the intention to reconstruct how APERe has started and developed, and to trace back Belgian INFORSE action as far back as possible.

There are three particular aspects we highlight in the Belgian part of the case study. In line with those foci, which emerged as themes in the earlier literature-based stages of the research processes already emphasis has been laid on the research questions pertaining to 1) historical development and development over time in terms of mainstreaming; and 2) network relations with surrounding actors and co-evolution with other 'shades of innovation and change'. This means a focus on research questions 1 and 2, and relatively less attention to research question 3 on empowerment, even if we collected information on this dimension too. In other words, the analysis of network or system evolution prevails somewhat over the attentiveness to individual actors, organisations and 'local manifestations'.

2.2.2 Interviews

Denmark

In the period August – December 2014, 11 semi-structured interviews with people working in INFORSE, VE and people, who are interacting or have interacted with INFORSE and/or VE have been carried out. In many of the interviews, both INFORSE and VE are mentioned and discussed:

- Gunnar Boye Olesen, regional co-ordinator of INFORSE (Europe), 19/08/2014, informal interview, approximately one hour
- Gunnar Boye Olesen, regional co-ordinator of INFORSE (Europe), 13/10/2014, formal interview, 90 minutes and short informal follow-up interviews
- Bjarke Rambøll, Head of Office, VE, 21/11/2014, 54 minutes
- Gry Bossen, UngEnergi, VE, 10/12/2014, 30 minutes
- Henning Bo Madsen (active member of VE and NOAH (Friends of the Earth Denmark)); 19./11./2014, 70 minutes
- Ann Vikkelsø, Energy Consultant, Copenhagen Environment and Energy Office, 17/10/2014, 83 minutes
- Jørgen Stig Nørgaard, associate professor emeritus, co-founder of OVE, energy savings expert, Technical University of Denmark, 12/11/2014. (120 minutes + notes from when the recorder was not recording)
- Niels I Meyer, professor emeritus, head of the Renewable Energy Committee (1982-91), Technical University of Denmark, 16/11/2014, 48 minutes
- Oluf Danielsen, associate professor, expert in the Danish anti-nuclear debate, Roskilde University, informal interview, approximately one hour

- Preben Maegaard, since 1983 Director of the Folkecenter for Renewable Energy, co-founder of OVE 11/11/2014. (109 minutes + notes from when the recorder was not recording)
- Steen Gade, member of the Danish Parliament, former director of Danish Environmental Protection Agency (1999-2004), 17/12/2014, 53 minutes

Belgium

Between October and December 2014, we conducted 8 semi-structured interviews with people working in APERe and in other organisations interacting with APERe:

- Jean-Marc Van Nypelseer, 1st APERe's General Secretary (1991-1997) , 10/11/2014, 78 min
- Michel Huart, 2nd (current) APERe's General Secretary (1998-2014), 15/10/2014, 66 min
- Suzanne Keignaert and Johanna D'Hernoncourt, APERe's staff charged with the mission of wind energy facilitator, 14/10/2014, 47 min
- Annabelle Jacquet, 1st EDORA's General Secretary (federation of RE entreprises) (2003-2009), 13/11/2014, 38 min
- Sébastien Cassart, consultant in charge with the study of feasibility of a "citizen energy Fund", 13/11/2014, 37 min
- Jehan Decrop, former member of the cabinet of the Walloon Minister of energy (2009-2014), 20/11/2014, 19 min
- Serge Switten, former member of the Walloon administration of energy (1988-2008), 02/12/2014, 72 min
- Fabienne Marchal, president of REScoop Wallonie, 04/12/2014, 51 min

2.2.3 Participant observation

Denmark

Participant observations were used to study two types of VE related interactions with society: a conference and a 'At the end of the road' event - this is the type of events VE uses to reach citizens in order to make them engage in energy savings:

- VE and UngEnergi arranged the conference 'Den grønne omstilling er billigst' (Green Transition is Cheapest) about VE's vision of 100% renewable energy in Denmark 2030, in the Danish Parliament's building, 28/10/2014, 3½ hours (Energi http://www.ve.dk/den-gronne-omstilling-er-billigst)
- 'At the end of the road' event in Soderup, arranged by Energitjenesten and the municipality of Høje-Taastrup 02/11/2014, 2 hours

Furthermore a very informal kind of observation has taken place, when we have visited the VE headquarters in Aarhus in relation to the interviews.

Belgium

Participant observations were marginal in our case study in comparison with semi-structured interviews and the documentary review. We attended/participated in these two events:

- Meeting 'Scenario negawatt' hosted by the association "Friends of the Earth" and featuring the French association Negawatts and APERe, Brussels, 20/09/2014, 180 min
- Conference 'Can we envisage a 100% renewable Belgium in 2050 in terms of electricity production, warming and transport?' hosted by the current APERe's General Secretary (Professor in Université Libre de Bruxelles), Brussels, 14/11/2014, 120 min

2.2.4 Document reviews

Denmark
Several types of documents has been reviewed: newsletters and annual reports from INFORSE and VE; webpages; popular books about VE and the development of renewable energy in Denmark; national energy statistics and research articles in international journals. A large number of documents have been reviewed but not all in depth.

Belgium
Our documentary review has been primarly focused on documents produced by APERe: the annual activity reports, their montly web-journal and other publications accessible on their website (studies, press releases etc.). This represents about thirty documents (see bibliography). Furthermore, we also reviewed the content of the websites and documents produced by other actors interacting with APERe, such as the federations REScoop Belgique and Wallonie and EDORA.

3 Analysis of transnational network(ing)

3.1 Transnational network: *INFORSE*

The transnational network in this case is INFORSE (International Network for Sustainable Energy) with a special focus on INFORSE Europe as one of the regional networks that are the backbone of the global network. Both of the local initiatives discussed in this case are members of INFORSE. INFORSE is a network of existing NGOs dealing with renewable energy. INFORSE has a basic policy document for sustainable energy development (a copy of the strategy can be obtained from Gunnar Boye Olesen). Any NGO that agrees to and signs the basic policy document can become a member, and they currently have 140 members in 60 different countries (http://www.inforse.org/presentation.php3#1, accessed 2nd Dec 2014). The network has a bottom-up structure, publishes a newsletter and is part of arranging regional meetings, where local member organisations are invited. INFORSE describes itself as an advocacy (interview with Gunnar Boye Olesen 13th October 2014), trying to transform societies into 100 % renewable energy. INFORSE's European network has their office in Aarhus, Denmark, in the same office as VE, the local initiative 1 in this case. The INFORSE office in Aarhus employs two people.
INFORSE links to a number of other international networks that are also concerned with renewable energy in some way (http://www.inforse.org/europe/links.htm, accessed 11th Dec 2014). Each network differs slightly from the others, e.g. in their aims. For example ISES, which focuses on solar energy (http://www.ises.org/index.php?id=12), Energia, a network that addresses gender and energy issues (http://www.energia.org/) or the Climate Action Network, with the vision "to protect the atmosphere while allowing for sustainable and equitable development worldwide" (http://www.energia.org/, accessed 11th Dec 2014). Most similar to INFORSE is CURES but CURES seems to focus their activities mainly on global Renewables conferences and less on the members collaborating and exchanging knowledge on smaller projects (http://www.cures-network.org/cures_about.html, accessed 11th Dec 2014).

The history of INFORSE described in this case has mainly been based on an account by Gunnar Boye Olesen Boye Olesen (employee in the INFORSE Aarhus office), supplemented with INFORSE newsletters (called Sustainable Energy News), especially their special issues related to the history of INFORSE. . In addition, an interview with Nordvestjysk Folkecenter for Renewable Energy, a member of INFORSE, and an interview with Niels I. Meyer have been conducted and support the historical account of INFORSE.

Essential to the establishment of INFORSE were Niels I. Meyers' international group of researchers, the international conference in Snekkersten 'Global Collaboration on a Sustainable Energy Development' on 25-28th April 1991, and the international contacts of Nordvestjysk Folkecenter. The conference in Snekkersten was an attempt to let representatives from developing countries meet representatives from industrialized countries to discuss possible solutions prior to the Rio Earth Summit in 1992 (Interview with Niels I Meyer 16th December 2014). INFORSE was established during the meeting in RIO on 4th June 1992 following the concern of several NGOs that

energy questions played a rather small role in the discussions on sustainable development. The group made a basic policy paper – a strategy paper describing Sustainable Energy Development. The strategy described in this document is as follows:

"This strategy should be seen as a single, but important part of a general strategy for sustainable development. A sustainable energy strategy must achieve a 60 % reduction of CO2 from the energy sector. This reduction has to take place in the industrialized countries, as they are the major contributors to energy-related CO2-emissions, the primary greenhouse-gas."

The paper describes both solutions – renewable energy, energy efficiency, conservation technologies and measures – and non-solutions - Nuclear Energy is not a solution and has to be phased out. The strategy ends with:

"Technology not enough

While transition to renewables and energy efficiency is an essential element in the development of a sustainable energy path, we must go beyond these technical solutions. We must make an honest and determined effort to examine and redefine our moral obligations toward our environment and the rest of the living creatures. We must decide upon a sustainable lifestyle for the future."

In 2000, a new charter was signed, with the

"Vision

A world where energy services, necessary for a just and human centred development, are provided in a sustainable way using renewable energy." (Charter downloaded from INFORSE homepage http://www.inforse.org/presentation.php3 29th Oct 2014).

INFORSE focuses on poverty reduction and environmental protection. The aims are awareness rising and advocacy, capacity building, institutional reform, research and development. At the very start of INFORSE Europe's life the organisation played an important role in developing renewable energy and energy efficiency in Eastern European countries. INFORSE connected 'small' local projects in Eastern Europe (interview with Ann Vikkelsø 17th October 2014). However, the founding of the activities in Eastern Europe have been scaled down, there are not as many funds for this form of activities. Some of the activities in Eastern Europe depend on the direct contacts between people in the network, while others are dependent on the existence of the network (Interview with Gunnar Boye Olesen 13th October 2014).

INFORSE is now working with other networks to make a revision of the current EU-regulation on wood burning stoves; Gunnar Boye Olesen participates in the discussions, trying to minimize the negative impacts from the stoves. INFORSE also follows, and has suggested supporting visions, to the development of visions of future energy supply, for instance the EU Sustainable Energy Vision 2040.

One of the reasons INFORSE was created was because it was evident that there were a number of NGOs around the World that shared a similar vision, and by creating INFORSE these could make a common vision (Interview with Gunnar Boye Olesen 13th October 2014). The work leading up to

the establishment of INFORSE involved a process to create the vision document which people could choose to support and when the suggestion to create a UN organisation for renewable energy was dropped at the Rio Conference in 1992 they started putting even more effort into creating this NGO collaboration to create INFORSE (Interview with Gunnar Boye Olesen 13th October 2014).
The timeline below sums up the main events related to INFORSE (the timeline is based on information from issues of Sustainable Energy News, with themes of INFORSE's history, and the interview with Gunnar Boye Olesen on 13th October 2014).

Year / period	Important activities/changes/milestones in transnational networking	Important changes in context
1992	INFORSE is created at the RIO conference on 4th June 1992 and had 44 members at the end of 1992	
1992-1993	INFORSE regional networks founded on all continents except Australia and Antarctica	
1993	INFORSE receives support from the Danish government.	
1998	New strategy was developed, and following this strategy, the INFORSE Charter was developed.	
2001	INFORSE has been registered as a UN observer since 1998 and followed a UN meeting, the CSD9, for the first time in 2001.	A new Danish government is elected. The new government makes significant cuts in the renewable energy sector affecting many Danish initiatives and NGOs in the field.
2001	INFORSE starts to develop scenarios and visions for how to realise the ideas of its members of a global transition to sustainable energy by 2050. This vision developed further for the RIO +10 conference in 2002	
2002	The change of Danish government in 2001 results in the removal of the official Danish financial support for INFORSE. As a result the Forum for Energi og Udvikling is dropped as the hosting organisation and instead the international secretariat of	

	INFORSE is taken over by the INFORSE Europe region and based at the office of the Europe Coordinator hosted by the organisation OVE. INFORSE had 132 members at this time.
2002-2006	The network starts to follow EU energy policies more closely than previously.
2006-2007	INFORSE finds that the outcome of the CSD is small and therefore reorients its focus towards climate negotiations within the UNFCCC.
2008	First participation in COP (COP14). INFORSE has participated ever since.
2010	Since the end of 2010 INFORSE has cooperated with other networks in the 'Southern Voices' programme.
2010-2011	INFORSE loses its EU support which puts pressure on the organisation. However, it receives support for its Southern Voices projects.

3.2 Aspects of 'innovation' and 'change' of the transnational network

INFORSE is a network and a main part of its activities has been to be a facilitator for the member organisations to get in touch with each other. When studying INFORSE it is hard to identify the INFORSE organisation's role in the projects, besides helping establish the contact between the organisations involved in the project. This creates a challenge in considering its relation to innovation and change, because it is hard to clearly identify how the INFORSE network has influenced projects. Their role as a lobbying organisation is even harder to identify as, for example, EU policy includes many different actors and identifying how each individual actor has had an influence on the policy development is impossible.

3.2.1 Relation with social innovation

INFORSE's activities are partly people centred. While the aim is to achieve renewable societies, the means to obtain that goal is recognised by INFORSE to be related to people, as for example in the following quote:

"People should be in the centre of environmentally sustainable energy programs... Social development models must be participatory, community based and decentralized." (Sustainable Energy News No. 7, December 1994).

INFORSE does not undertake 'field projects' but rather acts as an advocacy, (interview with Gunnar Boye Olesen 13th Oct 2014), for example by preparing hearing statements in response to different EU public consultations related to energy (http://www.inforse.org/europe/eu_policy_press.htm accessed 7th Jan 2015). The activities of the member organisations differ where some do field projects but others also act as advocacies (Interview with Gunnar Boye Olesen 13th October 2014).

Instead of studying social innovation in INFORSE, it is more relevant to consider INFORSE as a mediator creating the contacts or the link between members who can then come up with projects that may include social innovation. Gunnar Boye Olesen explains, in the interview, that one of the aims of INFORSE is that if some organisation wishes to cooperate with another organisation or the network, INFORSE can help by either being a partner in the project or facilitate the contact between the organisations (interview with Gunnar Boye Olesen 13th October 2014).

3.2.2 Relation with system innovation

INFORSE has from the very start tried to influence the existing energy systems acting as an advocacy on a European as well as on a global level. INFORSE has actively engaged in many different activities and policy forums related to renewable energy. Examples include the Climate Convention Conferences (UNFCCC) in 1995, 1997 and 1998, the Conference on the Sustainable Developments of Small Island Developing States in 1994, the World Solar Summit in 1996, and the UN Commission of Sustainable Development (CSD) in 2006. (Sustainable Energy News, No. 37, August 2002 and 73, June 2012). When it found that the UN Commission of Sustainable Development (CSD) gave a meagre outcome in 2006, INFORSE decided to focus more on the climate negotiations within the UNFCCC (Sustainable Energy News, No. 73, June 2012).

INFORSE can be seen as related to system innovation in the way that they advocate of changes related to the system, and in this way participate in a process of system innovation. However, the actual outcomes of such advocacy are hard to identify.

3.2.3 Relation with game-changers

From the very start, INFORSE has addressed climate change, and this is the main area they are trying to influence. Thus, their relation with climate change as a game-changer is directly related to the work undertaken in the network. INFORSE is advocating for the use of renewable energy to

deal with climate change. They do this through engaging in the processes of system innovation, e.g. by participation in conferences and meetings (see section 2.2.2).

Two major international events have been essential for the start of INFORSE. The first is the fall of the Wall in November 1989, which made contacts between Western and Eastern Europe possible, and different governmental schemes provided funding for energy related activities in Eastern Europe. The second were the Earth Summit in Rio in 1992, where the informal global village was part of the basis for establishing INFORSE's regional networks.

3.2.4 Relation with societal transformation

INFORSE advocates for transformation regarding the use of renewable energy, and they presented the idea of a society free of fossil fuels for the first time around 1997 (interview with Gunnar Boye Olesen 13th October 2014). In the political sphere there is an increasing focus on introducing renewables into the energy system for example in the aims of the EU 2020 Climate and energy package. In relation to societal transformation there is a trend towards the increased use of renewables. INFORSE is advocating, and has done so since its foundation, for increased use of renewables, hence their position has changed over the years from one of opposition to the existing energy policies to one whose visions correspond to the trend towards more renewables.

3.2.5 Relation with narratives of change

INFORSE is aiming at a 100 % renewable Europe, with the underlying assumption that it is possible if energy consumption is reduced.

One specific activity of INFORSE is helping the local NGOs develop scenarios for how a country can achieve the aim of 100 % renewable energy within 20, 30 or 40 years. One reason for developing scenarios is, according to Gunnar Boye Olesen (interview 13th October 2014), to speak the language of politicians and planners. These scenarios can be seen as a story of how to achieve the change, INFORSE is advocating, and in this way as narratives of change. Below is one of the graphs used to illustrate INFORSE's scenarios for Europe, copied from their website.

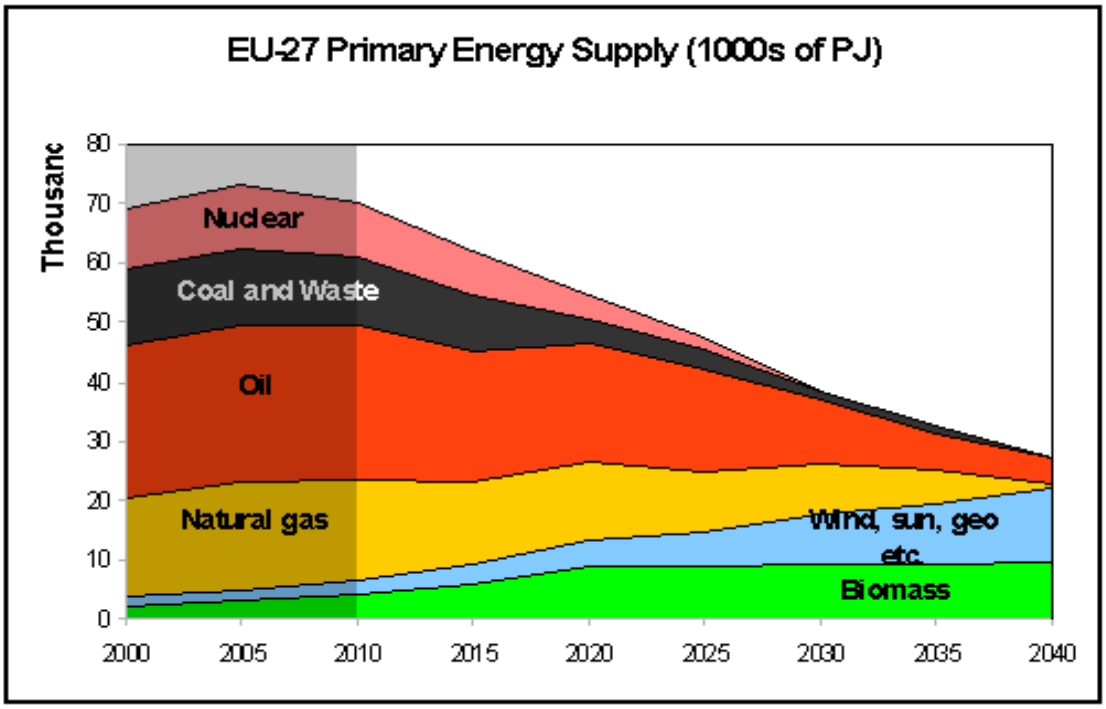


Figure 1: Development of EU-27 electricity production and sources, following the Sustainable Energy Vision (reference http://www.inforse.org/europe/VisionEU27.htm, visited 30th October 2014).

INFORSE has been part of developing scenarios for Denmark, Ukraine, Slovakia, Romania, Belarus, Lithuania (http://www.inforse.org/europe/Vision2050.htm, accessed 13th January 2015).

3.3 Aspects of empowerment and disempowerment of the transnational network(ing)

3.3.1 Governance

3.3.1.1 Internal governance

The internal structure of decision making is based on the bottom-up structure:

"In INFORSE, networking is understood as a process rather than a rigid structure. The members work to achieve in common what would otherwise have been impossible for the individual organisation to reach in terms of financing, political influence and capacity. The more the members engage in the network by sharing information and work together, the more the individual organisation benefit from

the network and the more effective is the network." (INFORSE homepage visited October 31st 2014).

INFORSE is governed by a group of regional coordinators, who facilitate cooperation among the network's members. The coordinators are elected by the members in their region. INFORSE-Europe has Gunnar Boye Olesen Boye Olesen as coordinator – placed at INFORSE's office in Aarhus.

3.3.1.2 External governance

INFORSE is from time to time involved in European projects with other NGOs. In the period 2009-2011 INFORSE was part of the FP7 project 'Low-Carbon Societies Network' together with French and German NGOs. INFORSE has organised yearly European Sustainable Energy Policy Seminars, where representatives of NGOs and representatives of EU institutions meet and discuss energy policy (Sustainable Energy News no. 68, March-April 2010).

Participation in different types of policy seminars is an important part of INFORSE's work. This work is presented in INFORSE's newsletter 'Sustainable Energy News' (see for instance Sustainable Energy News no. 37, August 2002; Sustainable Energy News no. 68 March-April 2010 and Sustainable Energy News no. 73, June 2012).

Although projects involving e.g. funding from the EU or work producing hearing statements to EU policy require a certain set of formalities, including using the online questionnaire for producing the statement (http://ec.europa.eu/energy/consultations/annex_online_questionnaire_en.htm accessed 7th Jan 2015), external governance did not appear to be a big topic of discussion or an issue in the interview with Gunnar Boye Olesen on 13th October 2014. INFORSE has to follow the procedures of certain authorities or organisations if it wants influence. However, as it seems to be something that is done without placing much further emphasis on it than needed, discussing it in relation to empowerment or disempowerment is irrelevant. It would run the risk of overanalysing a case for the sake of the case report rather than actually representing the case.

3.3.2 Social learning

Social learning processes are central for the network. Different forms of social learning takes place: Learning in seminars and workshops, where representatives of the different member organisations participate and exchange experiences – with a number of large seminars and workshops taking place in Eastern Europe in the 1990s.

A NGO-project in Belarus started in September 2012, involving the Swedish Skåne Energy Agency and the local Belarus Center of Environmental Solutions. The project, called 'Engaging Citizens in Sustainable Energy to improve Environment and local Economy' could be considered social learning from NGO to NGO, where the local NGO learns to run a dialogue with citizens, develop small demonstration systems, establish a free advisory centre etc. (Sustainable Energy News no. 74, November 2012).

The Hungarian INFORSE Europe member Kornyezeti Nevelesi Halozat Orszgos Egyesulet (KNHOE), Environmental Education Network Association, describe INFORSE as extremely important in relation to international connexions. It is described how INFORSE seminars, field studies and field trips have had an impact on the organisations work. Furthermore INFORSE has been decisive for the pioneering energy planning research project 'This way ahead'.

Apart from the West-East dialogue there has been a North-South dialogue in the INFORSE as a global network. One example of this is the project Southern Voices (Interview with Gunnar Boye Olesen, 13th October 2014).

Hence, through networking based on social learning, the members of INFORSE are empowering each other and empowered by each other and each others' knowledge. The network might be compared to a pool of knowledge that members can benefit from by using each other. Yet, it is a necessary condition that the members actively seek this engagement with the network – it does not come automatically by just being a member, as INFORSE is not actively in touch with all of its members (Interview with Gunnar Boye Olesen, 13th October 2014).

In the APERe Case it is described how APERe and another organisation, with the help of Rescoop had a study trip to Denmark in 2013, visiting both the Nordic Folkecenter for Renewable Energy (Danish INFORSE member), Samsø Energy Academy (Danish INFORSE member), the Ministry of Environment and some smaller Danish renewable energy initiatives, without the direct involvement of INFORSE Europe as an organisation. In that way, transnational social learning between INFORSE members takes place without the transnational organisation knowing it.

3.3.3 Resources

Of the aspects of empowerment and disempowerment on INFORSE, financing the network has played a role. INFORSE's activities have been dependent on attracting funding, and as funding often comes with some kind of requirements to what the money should go to, which funding INFORSE has obtained has influenced which projects could be undertaken. Thus, the financial resources both empower INFORSE to undertake projects but also place a limit on INFORSE's activities.

Figure 2: The regional coordinator, Gunnar Boye Olesen in the INFORSE part of the VE-offices in Århus

In terms of staff, the INFORSE Europe office employs two people who also work for the national Danish organisation, VE. INFORSE is by some considered as synonymous with the regional coordinator, Gunnar Boye Olesen: '*INFORSE - that is Gunnar'* (Interview with Niels I Meyer 16th December 2014). INFORSE has no membership fee and over the years the conditions for financing have changed. Funding of projects in Eastern Europe was relatively easy in most of the 1990ies, and numerous projects were developed in collaboration with Eastern European partners, sometimes with INFORSE as a part, sometimes just using the INFORSE overview of members (Interview with Ann Vikkelsø 17th October 2014). A change of the Danish government in 2001 led to a loss of the Danish financial support INFORSE had received since 1993 (Sustainable Energy News, no. 37).

The INFORSE website could also be a useful resource for the members. The database with contact details of the members have always been an important resource for the members, even before it came on the web (Interview with Ann Vikkelsø 17th October 2014). Yet, even though there is a large amount of information to be found on the website, including hearing statements on various

EU Policies, it is not clear how much the website is used, and hence, how relevant it is for their network. They also have a Facebook page with 205 likes – approximately 4 times less than VE and 3 times less than UngEnergi which indicates quite a low activity. INFORSE Europe has developed an energy vision guidance material, to be used by the member organisations for developing their own national energy visions.

3.3.4 Monitoring and evaluation

Gunnar Boye Olesen outlines six criterions of success in the interview of 13th Oct 2014. In the interview he assessed the success in relation of each of the six criterions. These are described below.

The first criterion of success is to be enough members to be able to be truly representative of those NGOs in Europe that has renewable energy as their focus – this is fulfilled. The second criterion for the organisation is to be a living network – here there is room for improvement as not all members are that active. The third is to be able to have a continuous activity – the activity level is ok, but not stable. The fourth is to be useful for members – as it is now it is not possible to be actively in touch with all members and ask them if they need anything. They will only get help if they contact INFORSE. A fifth criterion is to attract money to the network which is very difficult. The last criterion is to have influence. This can be interpreted in different ways: does INFORSE have influence because it is able to discuss with decision makers? Or should the influence be measured on the quality of the agreements concerning climate? (Interview with Gunnar Boye Olesen, 13th October 2014).

In relation to empowerment and disempowerment monitoring and evaluation do not seem to have any significant roles to play in this specific case.

3.4 Other issues about the transnational networking

INFORSE is a 'thin' transnational network with limited resources and a large number of members. The database of members has always been a central part of the resources, making contacts between members possible without involving the INFORSE secretariat. This makes it quite difficult to which extent – and how – ideas have travelled between members. Furthermore it is evident that there is a strong link between VE and INFORSE, and that experiences relating to VE have an impact on INFORSE.

4 Local initiative 1: *VE*

4.1 Overview of development in the local initiative

VE – 'VedvarendeEnergi' ('RenewableEnergy')– with the official English name 'SustainableEnergy' is the Danish organisation for renewable energy, and the founding Danish member of INFORSE.

Today the organization's vision is described as follows*: Our vision is 100% renewable energy in a sustainable world* (VE.dk accessed 22.10.2014)

Three values are described as core values in VE's work:

1. Public ownership – local democratic decisions
2. Independence – of party politics and commercial interests
3. Holistic approach: environmental concerns, social justice and economic responsibility

VE is an association of two organisations OVE (('Organisation for Renewable Energy', formed in 1975) and SEK ('Federation of Energy Offices', formed in 1977) who joined together in 2010.

Since OVE was the primary initiator to INFORSE, the early history of OVE can also be considered as the early history of INFORSE.

In order to understand the role that VE and previously OVE and SEK have played in the energy transition towards renewable energy in Denmark, it is worth looking into the formation of the Danish 'Energy Movement' that the organisations have belonged to since they was formed in the 1970'ies. The VE case is an example of co-evolution across TSIs. Because it is a very complex history with many different actors involved, we will focus on VE's activities in Denmark and leave out the international activities (Even though VE as an organisation has a lot of activities in developing countries). The development of VE can be described as a constant manoeuvring, a navigational process which it is not possible to describe using only a few points. Different actors have different interpretations of the history, and even though we try to cover the most important points, it is almost certain that some actors will feel, that we have forgotten essential elements in our tale.

At the time of the so-called 'oil crisis' of 1973-74 (when oil was the primary source of energy accounting for about 90% of the Danish energy consumption), it became obvious that it would be beneficial for Denmark to become less vulnerable to fluctuations in energy supply and energy prices. One of the proposed answers to the need for independency was nuclear power. However, this was not welcomed in the Danish public and led in 1974 to the formation of the Danish Anti-Nuclear movement 'Organisation for Information on Nuclear Power', OOA, with the aim of eliminating the introduction of nuclear power in Denmark ((Danish Energy Agency, n.a.; OOA, n.a.; here from Jørgensen & Andersen, 2012).

In 1975, OVE ('Organisation for Renewable Energy') was formed as a parallel to the anti-nuclear movement. Two environmental organisations were important in relation to establishing OVE, namely, besides OOA, NOAH (established in 1969 and since 1988 the Danish member of Friends of the Earth International) (Meyer 2000).

Some of the members of NOAH and OOA wanted to focus on the alternatives to nuclear power. They met in October 1975 and decided to form OVE, and an official press meeting was held in November 1975 (Beuse 2000).

OVE had a very loose grass-root structure until 1979, when it was established as a 'proper' organisation with a board and a general assembly. Preben Maegaard was amongst the founding members of OVE as well as it's chair from 1979-84. In 1974 he had established a local group of renewable energy practitioners, NIVE. According to Maegaaard, it was an expectation from the founders that OVE should be the energy movement's strong political voice advocating at the political level for the transition from fossil fuels to renewable energy forms on behalf of the members (Interview with Preben Maegaard, 11th November 2014).

Local groups of OVE were established in 1976, focusing on developing awareness in communities about energy savings. The context of the local groups was that OOA had established a number of local groups on the basis of NOAH's local groups (Danielsen 2006). Many of these local groups associated themselves with OVE; the members typically had a double- or triple membership. These local groups formed the platform for establishing, in 1977, the 'Local Environment and Energy Offices' and their umbrella, the Federation of Energy Offices, SEK (Beuse 2000). The NIVE group made Nordvestjysk Folkecenter for Vedvarende Energi, which later became the Nordic Folkecenter for Renewable Energy (NFC). The four entities, OOA, OVE, SEK and later NFC were the backbone of the Danish energy movement. OVE began to publish lists of relevant organisations and descriptions of relevant technologies (Terney and Maegaard 2000) and to publish the magazine "Renewable Energy" (http://www.ve.dk/magasinet-rastof accessed 18th January 2015).

In relation to SEK, it is the local activities in 'Local Environment and Energy Offices' that are decisive for the development of local renewable energy activities and activities related to citizens' energy savings. We will, however, often refer to all the Local Environment and Energy Offices as SEK. The local offices were relieving OVE from some of the local tasks, making it possible to focus more on national level policy development. Even though the organisation had a very flat structure, the activities of the local Environment and Energy Offices can be seen as a result of OVE (The local Environment and Energy Offices regard themselves as independent actors (Interview with Ann Vikkelsø 17th October 2014))

A number of the active persons were active not only in an OVE/SEK context, but also in a number of other contexts. This can make it difficult to distinguish between situations where OVE or SEK were involved and situations where they were not involved. However, the cooperation amongst different members of the energy movement was strong and it is maybe not so important to distinguish between who did what as it is to look at the joint results of the movement.

"*In OVE we felt that we had to save the country from destruction. We had to do something […] Such a state of mind encourages creativity in society. It was a popular movement where we met and exchanged experiences and knowledge about all the mechanical and technical. Much failed, much was forgotten, but out of the mist emerged something which created the Danish wind turbine industry" (Maegaard in Svendsen (2012).*

The starting point for this energy movement was, as mentioned, the joint struggle against nuclear power as a substitute for fossil fuels. Later on it became the battle against the polluting fossil fuels that was the primary focus of the energy movement, especially after nuclear power was finally abandoned by the Danish politicians in the mid-1980s, while the problems with first acid rain and later on climate change became recognized. It is also a part of the common 'history' of the energy movement, that it increasingly became a 'part of the establishment', as described by Hans Pedersen (2002) at SEK's 25 year anniversary. An important reason for this was that the alternatives were largely developed in cooperation with small and large businesses and because the main agriculture and industry organizations from the beginning saw their interest in participating in the development of the alternative technologies, as described by Preben Maegaard at the occasion of the Folkecenter's first 25 years (Maegaard, 2000). Also Tarjei Haaland from (then) OOA describes at the occasion of the Environment Ministry's 25 year anniversary, the growing recognition in the population as well as in public administration and the resulting influence the grassroots obtained in the years from about 1970 to mid-1990s (Haaland, 1996). (Here from Jørgensen & Andersen (2012)). Another reason for the success of the energy movement was the strong participation in the movement by university researchers who contributed with alternative energy plans to show that nuclear power was not necessary and that the use fossil fuels could be phased out(Interview with Niels I Meyer 16th December 2014).

Although the history of wind turbines for electricity production is long in Denmark, the governments were not in favour of supporting this technology at the time when the oil crises hit in 1973(Christensen and Thorndal 2012) . OVE was involved in the development of Danish wind power, having people involved not only promoting wind energy, but directly involved in the technological experiments. Wind turbines were in the 1970's and 1980s being built by groups of NGOs, craftsmen, small machine factories related to agriculture and other enthusiasts, at first using simple technologies and gradually scaling up their experiences (Maegaard 2000). There are numerous innovative examples of experiments that finally convinced the political establishment and led to public support for the development of wind turbines and for the construction of the mills. We will mention just a few examples that are important for the development of renewable energy in Denmark, and perhaps even can be considered as game changers:

- 1975 is the year when one of the Danish wind turbine pioneers, Christian Riisager, for the first time connects a wind turbine to the grid – without permission. (Christensen and Thorndal, 2012);(Karnøe and Garud, 2012).

- 1975 is also the year when the Tvind Schools under the slogan "Let hundred windmills bloom" started to build the legendary Tvind-mill (Østergaard 2000).

- In 1978, safety was discussed on one of the many meetings OVE arranged for wind enthusiasts, leading to a report on safety rules in 1979. If the frequent accidents had continued, the experiments might have been stopped (Stiesdal 2000). In parallel, the 'Test Centre for Small Wind Turbines' was established at Risø in 1978 (Rasmussen, 2000) as a public test center.

- The OVE meetings for wind enthusiasts were also a forum for discussion of other aspects than the mere technical aspects. In the late 1970ies, new forms of organising the ownership of wind turbines were discussed, and the first wind co-op was created in 1981, where 34 persons owned a 55kW Nordtank Wind Turbine. The co-ops – 'vindmøllelaug' – dominated

the ownership until the late 1990'ies, when it became more profitable again for private investors to own wind turbines. However, the first wind farm at sea is initiated by a co-op – Middelgrunden Vindmøllelaug – and built in the year 2000.

Funding is important for development of grass roots activities and the experiments with technological development. The funding possibilities were especially good in the period 1982 – 1992. Many projects related to OVE were funded by Styregrupen for Vedvarende Energi – The Committee for Renewable Energy. - In this period the committee was an independent, knowledgeable body, allocating public funding (Interview with Niels I Meyer 16th December 2014). Later the funding came under stricter governmental control. Preben Maegaard mentions that after 1992 socio-economic calculations were used to decide whether a project should be funded or not. (Interview with Preben Maegaard 11th November 2014).

A change in government in 2001 became a crucial factor for the development of OVE and SEK. Most of the funding for 'green' initiatives was shut down, and the organisations had to find ways of surviving. In 2005 a new initiative appeared – Energitjenesten ('The Energy Service') – which was organised in cooperation by OVE and SEK. Energitjenesten was made possible through a broad political agreement regarding support for local energy consultancy. Energitjenesten has a focus on energy savings and energy efficiency predominantly in private houses, in this way continuing and strengthening the work of the local Environment and Energy Offices in SEK.

In 2010, OVE and SEK merged resulting in the organisation VE. As a part of a strategy for revitalisation, Ung Energi ('Young Energy') started as an initiative in 2012, with a focus on getting more – and younger – volunteers into the organisation.

The timeline underneath gives an overview of important changes and milestones within VE, other Danish NGOs and the context of renewable energy and energy savings.

Year	VE	Other Danish NGOs	Important changes in context
1969		'The Environmental Movement NOAH is established.	Pollution of waters, air and landscapes was very visible and gave rise to protests at the local and national level.
1973			The 'Oil Crisis' gave rise to a switch in focus where countries, including Denmark, switched from oil to increasingly use coal. In Denmark, it was proposed (and promoted by politicians, civil service and energy companies) to introduce nuclear power.
1974		Formation of the North West Jutland Institute for Renewable Energy - NIVE. It is a network of practitioners who worked with local energy solutions that could replace fossil fuels and nuclear power. The Organisation for Information on Nuclear Power, OOA, is formed with	.

		the aim of preventing the introduction of nuclear power in Denmark.	
1975	'Organisationen for Vedvarende Energi' – OVE – is created.		
1976	The OVE magazine 'Vedvarende Energi' ('Renewable Energy') is published for the first time. As a response to the official Danish Energy Plan, OOA and OVE publish the first 'Alternative Energy Plan' made by independent energy researchers to show that Denmark could have a reliable energy supply without introducing nuclear power. The alternative plan criticised the strong focus on nuclear power and centralised power plants. A number of Local Environment and Energy Offices are established. focusing on developing awareness in communities about energy savings and local experiments with renewable energy sources		The first Danish Energy plan is published and included a switch from oil to coal and nuclear power, the establishment of a country wide network for natural gas, and heat planning in all councils and regions with the aim of energy savings. , Responding to the public and organisational protests, the Danish government announces that the decision on the introduction of nuclear power has been postponed indefinitely.
1977	In 1977 local energy agencies joined together in the Federation of Energy Offices (SEK)	Uffe Geertsen (from Kolding Højskole) takes the initiative to start Federation of Energy Offices (SEK)	
1978	OVE arranges a 'wind meeting' that gives rise to the Risø test station and the Danish Wind Turbine Owners' Association		The Danish decision on the introduction of nuclear power is postponed once again following two large anti-nuclear power demonstration marches.
1979	OVE is established as a formal organisation with a board and general assemblies.		
1981		The first wind co-op is created with the help of OVE.	
1982			A number of political parties form a so-called 'green majority' outside the government that supported a number of initiatives related to renewable energy; amongst other 'Styregruppen for Vedvarende Energi' (Committee for Renewable Energy) is formed with Niels I. Meyer as chair and support for the 'Nordic Folkecenter for Renewable Energy'. The second Danish Energy Plan is published.
1983		The Nordic Folkecenter for Renewable Energy'is created. Preben Maegaard became the chair of the Folkecenter.	An alternative energy plan is made. It played a significant role as the people involved in making the plan managed to get public attention so that it was not only a plan read by politicians and involved organisations but also many others.
1985	There are now 16 local energy		The Danish government decides that

	offices.		Denmark will *not* have/use nuclear power. A change in the law makes it harder for private people to set up wind turbines and, at the same time, requires the energy companies to set up wind turbines. The local environment and energy offices receives funding from Styregruppe for Vedvarende Energi
1987	KMEK (The Copenhagen branch of SEK – Copenhagen Energy and Environment Office) is established.		The Brundtland Report is published.
1990			As a reaction to the Brundtland report, the Danish Minister for Energy Jens Bilgrav-Nielsen asked his officials to make a strategy for the Danish energy system. This led to the third Danish energy plan 'Energi 2000' in which there was an aim to reduce CO_2 emissions by 20 % in 2005 compared to 1988. It was the World's first official national 'Brundtland Plan'.
1991			'Styregruppen for Vedvarende Energi' is transferred to the Danish Energy Agency, it is renamed 'VE rådet' and it is structured differently. Re-establishment of 'the Green Majority' in the Parliament. They implemented previous agreements on decentralised heating and on the introduction of CO_2 taxes.
1992	OVE creates INFORSE (with a range of other NGOs).		The Rio Summit – The Earth Summit on sustainable development.
1993			A new government led by Poul Nyrup Rasmussen, and with Sven Auken as Minister for Environment is elected. Sven Auken was pro-renewables.
1995			The EU publishes a White Paper called An Energy Policy for the European Union where 3 important energy-related political aims are stated; improved competition, security of supply and protection of the environment.
1996	OVE starts up a Thai-Danish project in co-operation with a Thai organisation financed by DANCED – The Danish Cooperation on Environment and Development. (This is the first international project of OVE and in the years since then OVE has had a range of other international projects). The project lasts until 2008.	Middelgrunden Windmill co-op is created in order to enable the first Danish offshore wind turbine park.	The fourth energy plan, Energi 21, is published. It maintained the aims of the Energi 2000 plan but added a range of new long term aims for 2030.. EU Green Paper published about the energy of the future: Renewable Energy.
1999			Denmark becomes self-sufficient in oil and has since then exported oil.
2000		OOA closes itself in May. Middelgrunden starts production	The electricity marked becomes liberalised in Europe.
2001			Change of Danish government. The support for the renewable energy field is decreased and a number of

			organisations need to find new sources of funding, including OVE, SEK and INFORSE.
2002	Many of the local energy offices must close as the result of the loss of public funding introduced with the change of government in 2001.		
2005	OVE receives a pledge of DKK 15 million from The Energy Savings Fund (Energisparepuljen) to create 'Energitjenesten' and collaborate with the local energy offices (and others?)		CO_2 quotas and the CO_2 emission trading scheme introduced in the EU.
2007		Samsø Energy Academy is established.	The EU heads of State and Government set a series of demanding climate and energy target to be met by 2020, known as the '20-20-20' targets. The targets become law in June 2009. The Danish premier minister launches a long term vision of Denmark being independent of fossil energy
2009	OVE develops a national energy plan aiming at transforming the energy system into a 100% fossil free system	Several Danish organisations develop national energy and climate plans as a follow up to the national vision and as a run-up to the COP15 conference	Denmark hosts 2009 United Nations Climate Change Conference, including the 15th Conference of the Parties (COP 15) to the United Nations Framework Convention on Climate Change (UNFCCC)
2010	OVE and SEK merge and become 'Vedvarende Energy' – VE		
2011	VE makes a 3-year contract with DANIDA covering all their international projects.		
2012	UngEnergi is established and VE receives support for the initiative Bæredygtig Ung.		The Danish political parties (except Liberal Alliance) agree on an energy agreement for 2012-2020.
2014	VE makes a 3-year contract with DANIDA in order to complete the project 'Energy, Environment and Democratic Development – Keys for Sustainable Change in Africa'. VE gets private funding for the project 'Hurtig Omstilling' (Fast transition) that includes a number of scenarios for how to transform the energy system to one that is based 100 % on renewable energy sources already in 2035.		

4.2 Aspects of 'innovation' and 'change' of the local initiative

4.2.1 Relation with social innovation

From the very start OVE has been based on creating networks among activists. Some of the activists were also involved in OOA and NOAH, but OVE is special in relation to action: the OVE members were not only saying no to nuclear power and proposing alternatives, but they were trying to *invent* the alternatives. This is happening in a close relationship with NIVE, which in 1983 became a formalised test center, the 'Nordic Folkecenter for Renewable Energy' (NFC). This was a result of the support from the 'alternative green majority' in Parliament. As one of the 'green' members of parliament, Lone Dybkjær, said in 1981 when the plan for the Folkecenter was debated*: 'Something practical has to happen now. We have to show people the alternatives to nuclear power'* (Maegaard 2000). The idea of making something practical is core to the development of OVE, and experiments were made in a number of places.

OVE and SEK were part of creating a network, which was a platform for social innovation. Social innovation has developed in different ways in relation to different types of renewable energy, energy efficiency and energy savings. In the beginning there were no large industries or public financial support, and the grass-root researchers and entrepreneurs organised themselves in groups both discussing societal alternatives and experimenting with new technologies. The way of developing technology was a social innovation, mixing different types of experiments and experiences with basic scientific knowledge. An alliance between the NGOs and researchers has been essential for the development of organisations, technologies and plans, for instance the development of alternative energy plans (Interview with Niels I. Meyer 16th December 2014). In the following the social innovation is described in relation to the different types of renewable energy, energy efficiency and energy savings.

Wind Energy
The development of wind turbines is an example of how the informal network, OVE was part of creating, was involved in the actual development of the technology using social innovation, making it possible for people with different experiences and skills to meet. In this aspect, the OVE meetings for wind enthusiasts ('Vindtræf') became a vital hub for the exchange of experiences. They were a source of two kinds of social innovation. Firstly the knowledge exchanges and the connections facilitated through the network were significant in the development and the industrialization of the wind turbine technology; secondly, in terms of financing of wind turbines in local co-operatives.

An example of the impact the informal network is the industrialization of wind turbine production. One of the small companies building wind turbines was a blacksmith in a village experimenting in collaboration with some of the members of OVE, and learning from some of the meetings for wind enthusiasts OVE organised. It is decisive for the development for the Danish wind turbine industry that it became known in the network that the blacksmith designed excellent wind turbines, but lacked capital and a business model (Karnøe and Garud 2012). A small farming machine company, with a more organised business model, took over in 1979; this was the start of Vestas wind turbines (Stiesdal 2000). Today, Vestas has installed more than 64 GW wind turbines – or almost 20 % of the capacity worldwide (http://www.vestas.com/ visited January 6th 2015).

A number of small companies were developed in the same way, having the OVE wind seminars as a base for inspiration and exchange of experiences. Per Alex Sørensen, who in 2000 was the CEO of Bonus Energy (Now Siemens Wind), describes how OVE was a catalyst of technological development of Wind Turbines (Sørensen 2000).

In contrast to all the small turbines, the alternative school Tvind managed to build a very large, 2MW, functioning wind turbine in 1975. The Tvind school was a social innovation in itself, but not in connexion to VE (Østergaard 2000). It is striking that this large 'amateur' wind turbine was a success in contrast to all governmentally supported large wind turbine projects. Some of the wind energy related discussions resulted in new, independent organisations relating especially to wind energy, for instance the interest group Danish Wind Turbine Owners' Association. This organisation has continued the tradition of yearly 'Vindtræf', where wind turbine enthusiasts discuss the development. One of the early 'Vindtræf' was an essential basis for the Test Centre for Small Wind Turbines that – as mentioned earlier - was set up in 1978 (Rasmussen 2000). The centre has played a central role in the development of the wind turbine technology, as the centre did not only test the wind turbines, but often helped producers with their design (Karnøe and Garud 2012).

The 'Vindtræf' and other activities in OVE was a platform for a second social innovation in relation to wind: a new way of financing wind turbines: the local wind turbine co-operative or co-ops. The wind turbines had grown in size and become more expensive – too expensive for normal families. The first wind turbine co-op was established in 1981 (Elmose 2000). Most of the installed capacity in the period from the early 1980ies to the late 1990ies was financed by local co-ops. In the beginning the co-ops had to be very local in order to comply with the governmental rules, established after pressure from the energy utilities. The utilities did not want people to become private electricity producers. In the late 1970ies people had to live within a distance of 3 kilometres from the wind turbine, in the mid 1980ies members of the co-op had live within the same municipality + 10 km. – in 1992 the rules was changed, making it possible to be member of a co-op in a neighbouring municipalities as well (Tranaes, n.a.) Despite the difficulties, co-ops played a major role for the financing, and were a platform for the citizen involvement in wind. A combination of larger, more expensive wind turbines and changed rules of financing made it attractive for large private developers to invest in wind farms after the turn of the century. From having public support due to local networks of owners, the public resistance towards large, land based projects started to increase.

NFC has recently had the consulting engineering company Rambøll investigating the possibilities of using wind farms for development, described in the report 'VINDMØLLER SOM LØFTESTANG FOR LOKAL UDVIKLING I UDKANTSOMRÅDER' (Wind turbines as a lever for local development in outskirt areas of the country) (Bak 2013). NFC and VE points at the importance of bringing the resources (the profit generated by the wind turbines) back to the public good (Interviews with Preben Maegaard 11th November 2014, Bjarke Rambøll 21st November 2014). One model of financing, benefitting the local neighbourhood is the traditional co-operatives. Another model is municipally owned wind turbines. A third model is a local foundation which has been used recently in Hvide Sande Harbour. The local foundations revenue from selling electricity has to be used for local purposes: energy renovation of the municipal buildings, renovation of the harbour and development of local tourism (Bak 2013, VE 2014)

Middelgrunden Windfarm – as a special case. Middelgrunden is an example of a large cooperative, an innovative way of locating wind turbines and innovative way of financing the initial stages of project. The idea of having a windfarm in the sea near Copenhagen originates from Copenhagen Environment and Energy Office (KMEK), one of the many local environment and energy offices – related to OVE, carrying out local activities. KMEK took the initiative to create Middelgrunden in 1996, with the idea of creating a large cooperative. At that time, sea based wind power was a novelty. The Middelgrunden Wind Turbine Cooperative was founded in May 1997, with initially approximately 1000 members. In the following years, the KMEK office contacted between 50.000 and 100.000 citizens, and 10.000 people bought 30.000 pre-subscriptions. Each pre-subscription meant approx. 7 € funding for the project's at the planning stage – an innovative way of funding the initial stage of the project, which would have been difficult to finance in other ways (KMEK 2003). Citizens were later invited to buy shares in the wind turbines. In 2013 there were 8420 people owning the 10 turbines (http://www.middelgrunden.dk, visited 8th of January 2015) . Middelgrunden Windfarm consists of 20 2MW turbines. Copenhagen Energy owns half of turbines. The Middelgrunden Wind Turbine Co-operation owns the other half. KMEK played a central role not only in relation to organising the cooperative, but also in the actual design, taking care of the visual impact: The turbines are located close to Copenhagen Harbour – very visible when you are approaching the city from the North. The turbines are placed in a circular arc with a 12.5 km radius, with a total length of 3.4 kilometres (KMEK 2003).

Biogas, biofuels, biomass, thermal solar heating and photovoltaics

While the development of wind energy is considered as a great success for Danish pioneer spirit and industrial as well as societal innovation, the development of bioenergy in different forms has not received similar positive attention in the public debate. On the contrary, bioenergy is assessed very differently among different NGOs and researchers. Thermal solar heating has been present in the public debate, but it has not been developed into a large industry like wind. However, in the early start of (O)VE, all kinds of renewable energy were discussed and groups of people in the environment carried out technical experiments. We will not describe these experiments in details here, but return to the question of biogas, biofuels and biomass in the paragraph about societal transformation. Photovoltaics have played an increased role in Denmark until recently when changes to the rules for funding and for selling surplus electricity to the electricity companies were changed. Big interest from private house owners and from private companies initiated a change of the rules reducing the economic benefits. Removal of barriers to cooperative solutions is discussed, perhaps making it possible to make local co-operatives or local foundations based on solar electricity.

Energy efficiency and energy savings

Reducing the overall energy-'demand' has always been a part of OVE's strategy for achieving energy supply based on 100 % renewable energy. This has been one of the fields the local Environment- and Energy Offices has been involved in from the very start of the offices, seen as a part of educating citizens in reducing their energy demand. It has been an especially important task for KMEK, having fewer possibilities to establish renewable energy supply in the dense city (Interview with Ann Vikkelsø 17th October 2014).

The main effort of the local environment and energy offices and Energitjenesten is to inform people about the possibilities of reducing energy consumption in their home in a very practical

way, inspiring them to change behaviour and to invest in different energy saving technologies. The local environment and energy offices have been experimenting with a number of ways of trying to engage people, being socially innovative in this way. With the establishment of Energitjenesten (the Energy Service), involving people in energy savings have even more focus.

One of the social innovations is the 'at the end of the road' event, now carried out by Energitjenesten. The technologies discussed have developed over time, but the basic format has been the same. Local organizations, for instance neighbourhood organisations can apply for an 'at the end of the road' event. The event takes place locally, requested by the local organization. The event starts with a short, simple lecture discussing possible energy savings, with a hand-on demonstration of different technologies – as energy saving windows, insulation materials, thermostats, LED-bulbs, reducing stand-by consumption etc. In the event we followed in the case-study, 7 residents in the village Soderup followed the lecture and participated in a discussion with the 2 representatives from Energitjenesten. The discussion was related to the actual problems related to the residents homes – with quite detailed discussions concerning the value of 10 cm extra insulation on top of a 20 cm insulation on a roof. After we had had the general discussion, 2 homes were visited – the group split in two. The household's different energy-related bills were studied and commented by the representative of Energitjenesten, followed by an inspection of windows, heat-pumps and different electrical appliances. In the house visited, there were no easy savings left, and the residents were quite aware of avoiding unnecessary use of electricity. A number of appliances were unplugged in order to avoid stand-by energy use (Participatory observation in Soderup 2nd November2014).

Figure 3: Energitjenesten has an 'at the end of the road' event in the village Soderup – telling about energy saving possibilities in relation to private homes

Energitjenesten is solving tasks that the regular technical consultants – for instance engineers from consulting engineering companies - would not engage in, it is a sort of pre-consultions, often leading to involvement of consulting engineering companies at a later stage (Interview with Ann Vikkelsø 17th October 2014). A visit by Energitjenesten can lead to an increased involvement of local craftmenn and in this way be a part of local economic development (Interview with Bjarke Rambøll 21st November)

From the very start, the effort for energy savings has, however, been underpinned to various degrees in different periods; and especially in the early days, when OVE was formed, is was discussed to what degree energy savings should be part of the alternative energy plans. Jørgen Nørgaard, the Danish expert on energy savings par excellence, was amongst the initiators of OVE. He explains that his close involvement in the newly formed organization became short, as he discovered that the majority of the members of the new organization were more interested in renewable energy technologies, than in technologies for saving energy – and even less were they interested in discussing changes in life-style. At least one of the members from OOA expressed concerns that if there was too much focus on energy savings in the renewable energy plans, it would discourage the public from involving in the anti-nuclear campaign. His reasoning was that the Danes were generally not interested in changing their life-styles and reduce their energy

consumption and, therefore, the alternative energy plans had to show that the use of fossil fuels could be reduced by using renewable energy and without major savings. This is reflected in the first alternative energy plan, where energy savings played a minor role although the future energy consumption was not predicted to increase. In the public plans huge increases were on the contrary predicted. (Interview with Jørgen Nørgaard 12th November 2014).

Hence, in relation to social innovation, OVE have also chosen their innovative activities based on how they could avoid pushing people away from them, and energy savings are a clear example of an area where OVE's activities have been very influences by this.

Ung Energi – Young Energy

In order to reach out to young people, VE created UngEnergi (translated: Young Energy) in 2012. UngEnergi is a network of people between 15 and 35 years, and its activities are run mainly by volunteers (http://www.ve.dk/vaer-med accessed 5th January 2015; interview with Gry Bossen 10th Dec 2014). Part of the idea behind UngEnergi is a positive approach towards sustainability showing young people specific things and activities they can do to act sustainably instead of only telling them what not to do (Interview with Gry Bossen 10th Dec 2014). For example buying secondhand clothes instead of new clothes and eating less red meat and more vegetables or chicken (http://www.ve.dk/fem-fede-rad accessed 5th January 2015). UngEnergi engages in social innovation through knowledge sharing both within UngEnergi but also by allowing the projects to 'spill-over' and be taken further outside the organisation (Interview with Gry Bossen 10th Dec 2015). They do this through running projects, for example Bæredygtig Ung where they educate young volunteers (15 – 35 years) to become 'change agents' who will visit high schools and make presentations on how to act more sustainably or solar panel projects where they visit festivals and help people build solar panels to charge their mobile phones (http://www.ve.dk/fede-projekter accessed 5th January 2015).

Cross-cutting reflections

Social innovation plays different roles for the different parts of the energy system, and the role has changed over time. One of VE's basic roles in this has been to develop and maintain an informal network of enthusiastic grass roots with an entrepreneurial spirit. However, VE has not been alone in relation to the development of the informal network: it has been done together with a number of other grass root organisations. This could be interpreted as a co-evolution across TSIs – OVE, OOA, NOAH, SEK and others.

At the very beginning, social innovative processes were closely linked to technical innovation in relation to wind. At some point the production of wind turbines became a regular industry. But in the early phase there was a co-evolution of the informal network and the technology. Developing the technology is essential for the network.

Social innovative processes have also been at play in the financing of wind based power, and in a period local wind co-ops were dominating in terms of wind power ownership, thus being central in relation to creating a market for larger wind turbines. There is a co-evolution of the TSIs and the market through new forms of ownership

The involvement of residents in energy savings in existing buildings has not changed that much over time,In the early days there were much focus on the possibilities of doing the refurbishment

entirely yourself. Now there is more emphasis on the importance of involving professionals in parts of the refurbishment. Refurbishment of housing has never become an industry in Denmark. There have been experiments with different ways of involving people.

VE have partly reinvented itself and found new ways of involving young people in aspects of renewable energy and energy savings, creating a platform for young people as volunteers.

Furthermore, VE has served as an incubator for several renewable energy related organisations, for instance the local Environment and Energy Offices, the Danish Wind Turbine Owners organisation, the Test Centre for Small Wind Turbines, et cetera. Copenhagen Environment and Energy office fostered Genbyg, a Danish company specialized in selling building components retrieved from demolition projects (http://www.genbyg.dk/, accessed 11th December 2014). Developing new organisations can be seen as a part of social innovation.

4.2.2 Relation with system innovation

The development of the Danish energy system is well described in literature; especially wind is compared with development in other countries.

'Experimentation played a crucial role in turbine development. Johannes Juul mainly based his design on experiments with small, simple prototypes. Independent Danish artisans in the 1970s began working with simple copies of Juul's design and relied on practical experience to develop and perfect theirown turbines. In contrast, Ulrich Hütter and the engineers in the Danish, German, and American wind technology research programmes all relied on theoretical design studies to determine the most promising wind turbine concepts, shape and size. Academic engineers showed little interest in careful experimentation with and gradual optimization of a single design, preferring instead to design new and ever more ambitious wind turbines. (Heymann 1998)

Garud and Karnøe have described the development as a process of bricolage: distributed and embedded agency; where a number of different actors play their role in the technological development. The close connections between the growing industry, the users and the test facility play a role (Garud and Karnøe 2003).

OVE plays a role in organising both producers and users – and is part of forming the basis for the test centre. There is an intimate interplay between the processes of social innovation and the system innovation. The notion of path creation has been used before in analysing the Danish wind turbine cluster (Karnøe and Garud 2012). Path creation implies that actors are able to shape their own path, yet they cannot entirely control it (Garud and Karnøe 2003). It is also influenced by other actors and the path becomes embedded in the paths the other actors are trying to influence, and in turn, the paths begin influencing them (ibid.).

The role of the grass-root networks is even clearer in the later works of Karnøe and Garud (2012), pointing to the importance of the entire environment in which people knew each other well. It was this environment that made it possible for the black-smith in Herborg – who had a promising wind turbine design – to meet the people from the small machine industry Vestas – who could make the production grow. The informal network of enthusiastic people with an entrepreneurial spirit is a

bridge between the social innovation and system innovation, demonstrating the complex nature of this socio-technical development.

KMEK was pushing the development of off-shore wind with Middelgrunden, organizing more than 8000 people in a co-op establishing Middelgrunden in collaboration with the Copenhagen Energy Utility. Employees from KMEK were in dialogue with a number of professionals in the process, playing a role in the innovation process – hence, people related to OVE played an essential role for the introduction of off-shore wind as a system innovation.

Karnøe and Garud (2012) emphasise that success relates to wind, whereas other renewable technologies like thermal solar heating and biogas have not been as successful in Denmark, compared to other countries. For instance thermal solar heating has been successful in Austria, as described by Ornetzeder and Rohracher (2004)

4.2.3 Relation with game-changers

Today, VE relates to climate change – perhaps with a development towards addressing sustainability in a broader sense (Bjarke Rambøll 21st November 2014). However, it was not only the climate problems which were in focus at the very start: A combination of the so-called energy crisis, The Environmental Movement NOAH and the anti-nuclear movement OOA were the basis, OVE started on. From the very start, OVE (now VE) relates both to a vision of a 100 % renewable energy and of local democratic decisions. The energy-crisis in 1973/74 hit Denmark, then dependent on fossil fuels, hard. The energy sector and the government then aimed at introducing nuclear power in Denmark – strongly opposed, as earlier mentioned, by NOAH, OOA and OVE. The focus of OOA was to demonstrate the negative consequences of nuclear power, especially the lack of safety and the problems with storage of nuclear waste. OVE focused on providing the alternatives – heavily attacked by the energy sector and the pro-nuclear movement (Danielsen 2006). Some of the early actions might, as mentioned in the introduction to VE, qualify to be game changers:

- 1975 is the year when one of the Danish wind turbine pioneers, Christian Riisager, for the first time connects a wind turbine to the grid – without permission. (Christensen and Thorndal, 2012);(Karnøe and Garud, 2012).

- 1975 is also the year when the Tvind Schools under the slogan “Let hundred windmills bloom” started to build the legendary Tvind-mill (Østergaard 2000).

- In 1978, safety was discussed on one of the many meetings OVE arranged for wind enthusiasts, leading to a report on safety rules in 1979. If the frequent accidents had continued, the experiments might have been stopped (Stiesdal 2000). In parallel, the 'Test Centre for Small Wind Turbines’ was established at Risø in 1978 (Rasmussen, 2000) as a public test center.

- The OVE meetings for wind enthusiasts were also a forum for discussion of other aspects than the mere technical aspects. In the late 1970ies, new forms of organising the ownership of wind turbines were discussed, and the first wind co-op was created in 1981, where 34

persons owned a 55kW Nordtank Wind Turbine. The co-ops – 'vindmøllelaug' – dominated the ownership until the late 1990'ies, when it became more profitable again for private investors to own wind turbines. However, the first wind farm at sea is initiated by a co-op – Middelgrunden Vindmøllelaug – and built in the year 2000.

Changes in government and in governmental funding and governmental rules for ownership and conditions and prices for feeding in renewable energy to the electrical grid have several times changed the conditions for development of renewable energy and energy savings in Denmark, which has also had implications for OVE's/VE's activities. One of these, the earlier mentioned shift from funding based on energy-professional considerations in the Committee for Renewable Energy in the period 1981 – 1991 to decisions based on socio-economic calculations might qualify as a game changer.

A recent game changer was the announcement by a former liberal premier minister of a long-term vision about Denmark as independent from fossil fuels. This made OVE/VE develop a renewed focus on development of national energy plans, leading to development of national transition plans in 2009 and 2014 (http://www.ve.dk/fra-2005-til-i-dag-undervisning-og-energibesparelser) (VE 2014)

4.2.4 Relation with societal transformation

The Danish society has been transformed toward an increased use of renewable energy. VE describes that the organisation has been a part of this change, but that the organisation's role should be seen in connection with a number of other NGOs – the Danish energy movement (Interview with Bjarke Rambøll 21st November.2014). The last couple of years more attention has been given to local democratic development and local involvement, as a part of getting 'back to basics'. If local wind energy projects are to be developed it is important with local acceptance. Land based wind turbine projects are perhaps more accepted locally, if the local citizens are involved in the projects and the income from the wind turbines is benefitting the local society (Interview with Bjarke Rambøll 21st November.2014).

One of the important roles relates to nuclear power: OVE has together with OOA played an essential role in the Danish decision of **not** getting nuclear power in Denmark – which again is crucial for the development of renewable energy as an energy source(Interview with Steen Gade 17th December 2014)(Danielsen 2006).

The Danish society has changed from 5 % renewable energy in 1990 to 25 % renewable energy in 2012 (Energistyrelsen 2014). Wind has an increasing role in the production of electricity:

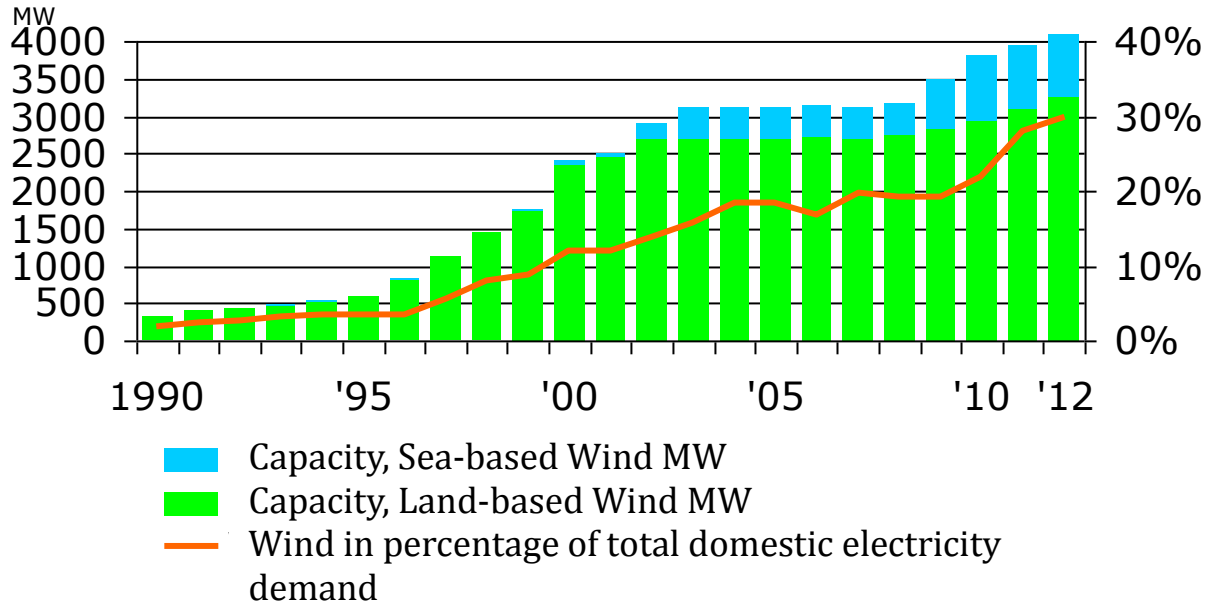


Figure 4: Development of wind based electricity in Denmark 1990 – 2012. (Energistyrelsen 2014)

In 2014, Danish wind turbines produced electricity corresponding to 39.1 % of the Danish electricity demand (http://www.energinet.dk accessed 08th January.2015). The production of wind energy was 37 PJ in 2012. However, the share of bio-energy (including incineration of solid waste) is more than twice as large: 82 PJ in 2012. There has been a large increase in the use of wood during the last 10 years (Energistyrelsen 2014).

Furthermore, VE is seen as a part of democracy by a number of politicians (not all – some right wing politicians does not consider NGOs a part of democracy). The interaction between the bottom-up processes and the top-down processes is seen as essential. Different political fights have been important in the development: the fight for the right to feed electricity into the grid and getting a proper price, and the fight for getting the electricity sector to invest in wind are examples of such fights (Interview with Steen Gade 17th December 2014).

The possibilities for public funding is also highlighted as important in the development towards the increased role of renewable energy: *'Probably nothing had changed in Denmark, if we had not had the collaboration with official bodies like Committee for Renewable Energy which could support projects when they needed money – and that they all did. We had probably not made it without public support in the 1970ies and 1980ies. Both parts are decisive: the understanding in society and especially the enterprising idealism of the grass roots. If you do not have this correlation, nothing will happen!* (Interview with Niels I Meyer 16th December 2014, former chairman of Committee for Renewable Energy)

As mentioned earlier, one of the ways, VE is working with societal transformation is by demonstrating the possibilities of obtaining a 100 % renewable energy based society, by taking

part in the development of alternative energy plans in 1976 and 1983, but also recently by developing its own renewable energy visions in 2009 and 2014 (VE, 2009; VE, 2014).

In the governmental plan for Denmark as a society based on 100 % renewable energy, bioenergy plays together with wind power a major role. Until recently, the perception of CO_2-neutrality of bioenergy was repeatedly mentioned as a reason for considering bioenergy as a sustainable energy source in both the alternative and governmental energy plans in the last decades of the 20est century. However, an analysis of the shaping of the Danish bioenergy arena shows that the Danish bioenergy arena today is much more complex and show more conflicts about both the present situation and visions for the future than 20 years ago. Analyses of the controversies about the future role of bioenergy in Denmark show that sustainability of bioenergy depends on how sustainability is defined and assessed, how much bioenergy is produced, how the bioenergy is produced and consumed in terms of environmental and social conditions, how the present production and consumption of energy is changed, and how other ways of production and consumption is affected (like food availability) (Jørgensen and Andersen, 2012).

Biogas from agricultural manure is one of the bioenergy forms, which is highly debated. Currently, there is a strong political support for biogas plants – supported by a 'Biogas Taskforce' in the Danish Energy Agency. Biogas is supported the farmers' organisation promote manure as energy source for biogas production and a strengthening of the natural gas regime while also reducing climate impact and nuisances from the application of manure as fertiliser. VE is supportive of biogas (VE, 2009; Olesen, 14th November 2014).

Biogas has been met with scepticism from NOAH, another Danish INFORSE member, who argues that the biogas path might be used as arguments for continuation or even increased animal husbandry and that the biggest reduction of climate impact from agriculture would be obtained from reduced animal husbandry (here from Jørgensen & Andersen, 2012). NOAH claims that the environmental assessment of biogas from manure should include impacts from the production and use of fodder for animal husbandry and not consider the manure as a 'free' waste product from animal husbandry. Furthermore NOAH does not see manure as a renewable energy source since it partly is based on imported resources, produced in South America with big environmental and social impacts including big inputs of fertilizers and pesticides (here from: Jørgensen & Andersen, 2012). VE does not discuss the animal agriculture in their energy visions and mainly sees the necessary change in the agriculture as a change towards perennial crops which can serve several purposes and reduce the competition about land use (VE, 2009).

The need for additional biomass added to the manure from animal husbandry in order to make the biogas plants work has also been criticized. The use of especially maize grown for the purpose of adding it in biogas production is criticized for having, amongst other things, a negative impact on the climate by some researchers and by The Ecological Council (Ege, 2012) (here from: Jørgensen & Andersen, 2012). VE are in favour of limiting the use of additional biomass further than is presently requested by governmental regulation (Interview with Gunnar Boye Olesen 9th January 2015).

Differing points of view among Danish NGOs are also seen in relation to both biofuels for transport and biomass for heat and power production as described in more details in Jørgensen & Andersen (2012). VE has moved from not critical to more critical and is now placed in between as the

organisation is arguing for the idea that the bioenergy should be based on Danish resources and biomass for energy should not be imported. VE does not believe that it is possible to ensure the sustainability of imported biomass through enforcement of effective sustainability criteria (http://www.ve.dk/energiforsyning, accessed 31 March 2015).The focus on national is considered by some as a 'radical' position, e.g. for instance the director of the business association 'Danish Energy Association', who, at the occasion of the conference at The Danish Parliament (28th October 2014), named this position to be national-romantic.

Another critique of VE's position in relation to sustainable development is related to the de-growth debate. One of the original funders of OVE, Jørgen Nørgaard, argues that VE should play a more visible role in this debate, especially in relation to sufficiency (Interview with Jørgen Nørgaard 12th November 2014).

4.2.5 Relation with narratives of change

The basic narrative of change is that demonstrating the possibilities of renewable energy supply and energy savings to people will eventually lead to a changed energy system. The organisation is working both with (and at times in opposition to) industry, utilities, politicians and local civil society. The local dimension is seen as essential, even though VE did not work directly with the local level in a period – when it predominantly were the Environment and Energy Offices that worked locally. VE does not see itself as being a single, important actor in relation to change. VE sees itself as **a part of a larger movement, contributing to change** towards a society based on 100 % renewable energy (Interview with Bjarke Rambøll 21st November 2014).

OVE has been part of the development of alternative energy plans together with researchers, demonstrating that a society based on 100 % renewable energy is possible. OVE and OOA have been essential for the dissemination of these alternative plans, as a part of telling the story that a 100 % renewable society is possible (Interview with Niels I Meyer 16th December 2014).

However, it is no longer controversial to state that Denmark should be based on 100 % renewable energy. This is one of the reasons why VE wants to change the organisation's role. But there are still differences between the most general ideas of the change and VE's vision. One of the controversies is about the speed of the transition. VE is arguing that the transition should happen faster, and the transition to 100 % renewable energy in 2030 is possible (VE 2014).

4.3 Aspects of empowerment and disempowerment of the local initiative

4.3.1 Governance

4.3.1.1 Internal governance

VE is an organisation with approximately 1500 members, most of these personal members, having a board consisting of members and employees. The board is elected on the yearly general assembly. VE is an umbrella organisation covering 17 local organisations – Environment and Energy Offices – and 6 Centres hosting Energitjenesten (http://www.energitjenesten.dk/ visited December 10th 2014) Many members are members of VE because they automatically have become members of VE when they become members of a local environment and energy office. The Environment and Energy Offices are independent organisations whereas the Centres are governed (partly) by VE. There is an ongoing discussion of the top-down versus bottom-up processes in the organisation (Interview with Ann Vikkelsø 17th October 2014)

Members are empowered by being shown different ways in which they can contribute to a change in the energy system – investing in renewable energy, investing in energy savings in their home and/or changing their energy practices.

4.3.1.2 External governance

The external governance structure has been developing over time, from a focus on more or less total independence – working only with closely related NGO's like NOAH and OOA – to a focus on creating partnerships with a number of different organisations, including private consultants, developing different types of projects. This is perceived as a part of the professionalization of the organisation. Another part of the professionalization is the use of consultants creating ideas of internal organisational change – for instance World Perfect and Kaospiloterne (Interview with Bjarke Rambøll 21st November 2014)

The interaction with the political level has been partly been a co-shaping, where the dialogue with the politicians have been part of shaping the conditions for the organisation and its work (Interview with Bjarke Rambøll 21st November 2014). This resonates well with the co-creation of resources described by Karnøe and Garud (2012), and the interaction with researchers in relation to the Committee for Renewable Energy (Interview with Niels I Meyer 16th December 2014). There have been periods of opposition, leaving the organisation in a difficult position concerning funding opportunities. The center-left of the Danish Parliament finds that the grass-root activities are an essential part of democracy, and are a part of creating the basis for change. Initiatives do, however, not always come from the bottom (Interview with Steen Gade 17th December).

The energy sector and the utilities were opponents in the 1970ies, 1980ies and the first part of the 1990ies. The energy sector had a major influence on the rules. The rules with restriction on ownership, residency criterion, consumption criterion and tariff conditions made it difficult to own and finance wind turbines. Electricity utilities put a very high fee on connecting a wind turbine to the grid, which could be perceived as harassment (Tranaes n.a.). However, the utilities had to pay a political price for the consumption criterion: they were forced to invest in wind turbines – which became one of the decisive factors for the development of wind power technology (Tranaes n.a.). The electricity utilities forced interest in wind energy led to collaboration between the energy utility 'Københavns Energi' and the KMEK based 'Middelgrunden Vindmøllelaug in the late 1990ies. KMEK fostered the idea, but the Middelgrunden Wind Farm was developed in collaboration with 'Københavns Energi'. Former opponents became collaborating partners. The liberalisation of the electricity sector in EU, and the increasing larger and more efficient wind turbines made it attractive for large developers to invest in wind energy.

The municipalities have been important actors in relation to the local environment and energy offices. KMEK did develop several large projects in collaboration with the Municipality of Copenhagen, for instance a large recycling scheme in the city district 'Nørrebro', as a part of a larger EU-life project. KMEK was part of developing a large network of urban gardens in Copenhagen. The collaboration with the municipality was important, and even though the Municipality of Copenhagen is a large organisation, it was often easier to access than the state (Interview with Ann Vikkelsø 17th October 2014).

VE has tried to influence the national energy policies by participation in numerous committees and by developing energy visions on the national level (Interview with Gunnar Boye Olesen 13th October 2014). It is however important to realize that the most transformative power of VE is not the formal interaction between VE as an organisation and other actors but the most transformative power lies in the informal, dynamic relations: that VE is a part of a larger grass root environment, interacting informally with researchers, politicians and others. Furthermore, it is important that VE has been part of carrying out many practical experiments, demonstrating the alternatives to the 'energy regime' not only in words, but in practice.

The development of the Danish wind turbine industry has, as mentioned before, been the subject of many studies. Studying the development of VE (and the environment, VE is part of) is however a different story. VE plays a number of different, decisive roles in the development of the Danish wind turbine industry, but VE does not only focus on wind. The development of funding, the Danish wind market, the industry and VE's activities are illustrated in the figure below:

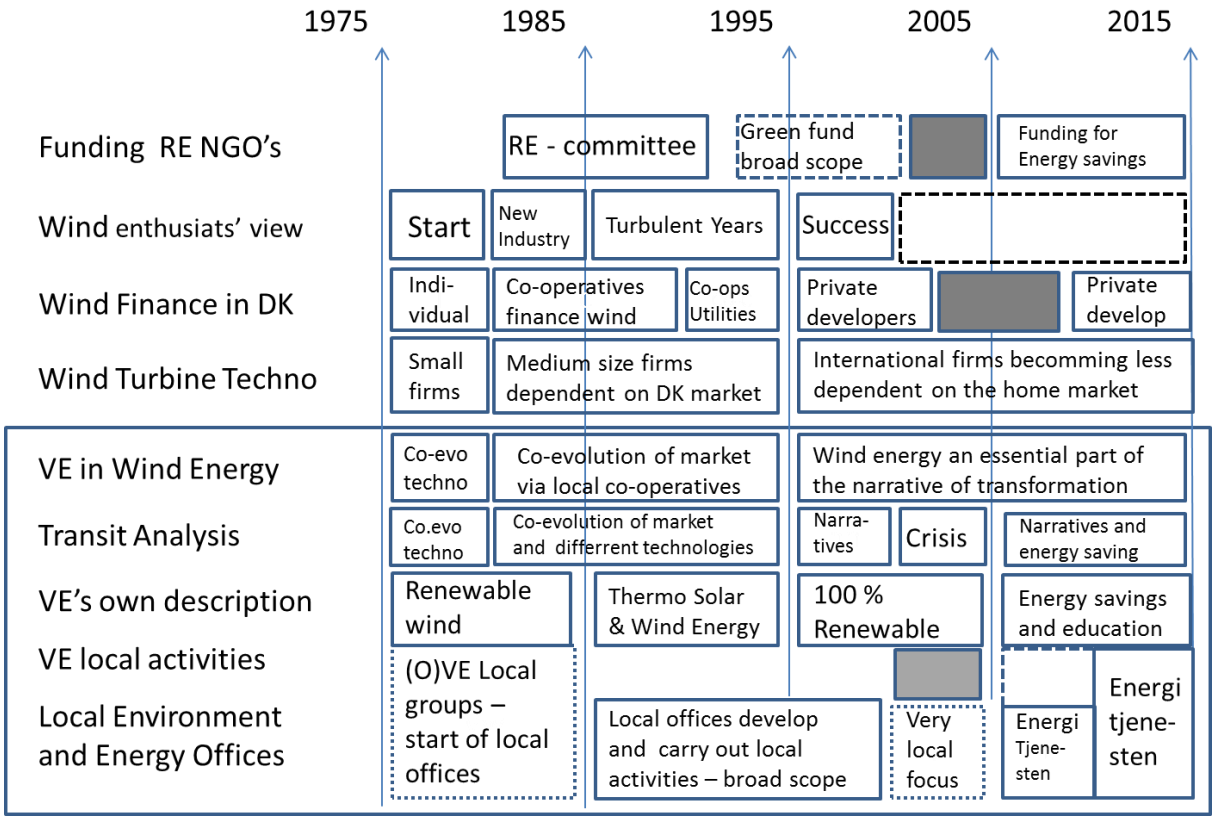


Figure 5: funding, the Danish wind market, the industry and VE's activities 1975 – 2015, based on (Nielsen 2000) and VE's homepage (http://www.ve.dk/fra-graesrod-til-organiseret-bevaegelse, accessed 18th January 2015). VE's activities are in the bottom in the box.

This description is trying to summarize essential parts of the description made earlier, supplemented with the wind enthusiasts view (Nielsen 2000) and VE own description of the organisations history – accessed from VE's homepage (http://www.ve.dk/fra-graesrod-til-organiseret-bevaegelse, accessed 18th January 2015). Some of the main developments are described in the following:

In the period 1975 – 1979, VE plays a role in the co-evolution of technology and the social networks that are decisive in the development of the technology – described as the little box 'Co-evo techno' in the row 'Transit analysis'. It is a hands-on period; people interested in wind meet and discuss their experiments. These experiments with technologies continue with thermal solar heating, use of bio-gas etc. Wind turbines are small, produced by small firms and typically owned by individuals. Wind enthusiast describes the period as the start: 43 wind turbines with a total electrical power of 2968 kW. The Energy Utilities were against wind energy in this period.

In the period 1980 – 1994, the Danish wind turbine industry is growing, and even though the industry is operating outside the boarder of Denmark, the Danish market is still important, and in the period 1987 – 1994 the domestic market is decisive for the industry. VE now has a role in inventing the local wind co-operatives, and in that way creating a market for larger, more efficient; more expensive wind turbines and more competitive wind turbines – the 600 kW turbines. The introduction of the wind co-operatives and favourable political conditions made the industry survive the meagre years. By 2001 more than 175000 households owns 80 % of all wind turbines

in Denmark. (Mendonca et al 2009). The different restrictions on wind turbine ownership support the establishment of wind co-operatives and make it difficult for large developers to enter the market. The development of the wind market goes along with experiments with other technologies, for instance thermal solar heating. Although the some local Environment and Energy offices have started earlier, the local offices get really gets a boost with funding from the Renewable Energy Committee in 1985. The broad scope of the local offices makes it possible to attract funding from the Green Fund, which is not specifically related to Renewable Energy. Political pressure forces the utilities to invest in wind turbines – utilities begin to play a role as wind turbine owners in the 1990ies. Wind enthusiasts divide the period in two – from 1980 – 1984 is 'New industry' and the period 1985 – 1994 is called 'Ten turbulent years'. From 1980 to 1984 686 wind turbines are installed with a total electrical power of 25068 kW. During the turbulent years 1985 – 1994 3161 new wind turbines with a total electrical power of 519117 kW are installed.

After 1995, the industry becomes more international, and the co-operatives play a lesser role in the financing. VE focuses on promoting the idea of wind energy in the Danish energy system, developing scenarios – this is interpreted as 'Narratives' in the transit analysis row. The wind co-operatives established in the earlier period does continues, and in statistics from 2004 show that 100.000 members in wind-co-operatives own 3200 turbines, representing 23 % of Denmark's capacity. However, after 1995 it was predominantly large farmers and private developers investing in the new, larger wind-turbines. Public support for wind energy was weakened, and the support given to individual farmers could be stigmatized as "large landlords getting financial support from public monies" (Mendonca et al 2009).

After the election in 2001, there is almost no funding for renewable energy and after a while the development of wind energy in the Danish energy system stops. VE and other grass root organisations suffer from the lack of national funding, some of the local Environment and Energy offices has to close, while others survive on municipal projects. The period 2001 – 2005 is named crisis in the transit analysis row in figure 5 .The Danish wind turbine industries are, however, no longer only dependent on Danish market. With the development of 'Energitjenesten' in 2005, some of the surviving offices get a new chance of developing projects with energy savings in focus. After a total standstill in the development of wind energy in the Danish energy system from 2003 – 2009, Wind enthusiasts call the period 1995 – 1999 for 'Success', in the period 2018 wind turbines with an electrical power of 1235841 kW are installed. As the wind enthusiast story of the Danish wind turbine history end in 2000, they have not given the recent development names.

Wind energy plays a major role in the Danish energy system transition. Citizen-led bottom-up initiatives, the social network making actors know each other, the stepwise development of the wind turbine size, the development of ownership restrictions and the development of supporting policies has been some of the explanatory factors. VE has played at least three essential roles in the development of wind energy: 1: VE has been a part of the co-evolution of technology and the social network; 2: VE has been part of the co-evolution of a market for wind turbines; and 3: VE has created a narrative of change of the Danish Energy system to 100 % renewable energy. In this way, VE can be described as transformative.

There are, however, no simple description of the link between the development of VE and the transformation of the energy system in Denmark. Furthermore, VE is not only related to the

development of wind energy in Denmark, but to a number of different forms of renewable energy and energy savings, with local actions related to the local environment and energy offices in some phase of the development. **Looking at the organisation VE, the development can be described as a continuous navigation process. Constantly the organisation has to manoeuvre trying to figure out how it can influence the transformation to a 100 % renewable Denmark in what the organisation finds the best way. It is a constant manoeuvring in relation to other actors; in relation to conflicts; in relation to opportunities and in relation to the development of the energy system.**

At present, there is no consensus among the NGOs relating to renewable energy what concerns the use of bio-mass, and some NGOs criticise VE for promoting bio-mass in their scenarios, due to a to narrow focus on the transition to 100 % renewable energy.

The relation between VE and wind energy in Denmark is still evolving. The development of the wind turbine industry has resulted in large wind turbines. When the citizens became involved in wind turbines via local co-operatives the diameter of the rotor typically was 15 – 20 meters. In 2005, the typical diameter was 120 meters, and the owners were no longer co-operatives, but private developers. From being appreciated by local citizens, wind turbines became an object of public resistance (Christensen and Thorndal 2012). This development does, however, give VE the opportunity to develop local projects that the citizens recognise as positive for local development – and in this way becoming social innovative in relation to wind energy once again.

4.3.2 Social learning

Social learning has played an essential role in relation to VE. The organisation has formed a platform for a number of different informal learning processes, where groups of people learned about different aspects of renewable energy, energy efficiency and renewable energy. Some of these processes have had the shape of seminars or yearly meetings – for instance the 'Vindtræf' mentioned earlier, which meant much for the development of the Danish Wind Turbine industry.

VE has been an important part of the public enlightenment concerning energy questions. They have been very concrete in the way they have been discussing renewable energy, energy efficiency and changed energy behaviour with people.

The Environment and Energy Offices – and lately Energitjenesten – have developed rooms for learning and interacting with interested citizens. Both permanent and mobile exhibitions have been a part of this – with the mobile exhibitions being a part of markets, festivals and 'at the end of the road' events.

VE and some of the Environment and Energy offices have had newsletters as a form of the communication – and they have eventually developed websites with relevant information. VE is still publishing a quarterly news magazine 'Råstof' – earlier called 'Vedvarende Energi. Some of the ways of disseminating knowledge, developed by VE and the Environment and Energy Offices – for example very specific catalogues of energy saving devices – have been taken over by SparEnergi, a part of the Ministry of Energy (Interview with Ann Vikkelsø 17th October 2014)

VE has eventually learned new ways of interacting with people, for instance in relation to 'Ung Energi'. In UngEnergi it is very much about social learning, drawing on the knowledge of VE, Energitjenesten and the volunteers, and sharing and disseminating that knowledge as far as possible into the society (Interview with Gry Bossen 10th Dec 2014). In their projects focus is on creating awareness of how to become sustainable through specific actions such as buying secondhand, eating less meat or how to build solar panels, and encourage young people to take that knowledge with them and allowing it to spread further.

Finally, OVE has been part of the development of alternative energy plans together with researchers, demonstrating that a society based on 100 % renewable energy is possible. OVE and OOA have been essential for the dissemination of these alternative plans, making the plans publically known (Interview with Niels I Meyer 16th December 2014). The latest of these plans is 'Hurtig omstilling til vedvarende energi' (Quick transition to renewable energy)(VE 2014).

4.3.3 Resources

Funding is a challenge for VE and Energitjenesten. The basic funding is small (8,6 million Danish Kroner, meant for Energitjensten in 2013), and from January 1st 2015 the organisation(s) have no basic funding – they are totally dependent on projects. The yearly turn-over is approximately 30 million Danish kroner, of which approximately 14 million relates to international projects, predominantly in the third world. VE has approximately 65 employees, with approximately 20 persons in the main office in Aarhus (http://www.ve.dk , visited 11th December 2014).

Drastic changes in the economic conditions are not unusual in relation to VE. Conditions were good in the mid 1980ies due to the 'alternative green majority' in the Danish Parliament and 'Styregruppen for Vedvarende Energi' (The Renewable Energy Committee), funding renewable energy initiatives in the period 1982-1992. The committee was unique in the way that it was relatively independent of the Ministry although it had much money to spend. The members of the committee were all people that knew the challenges of developing renewable energy well, and willing to spend money on small, grass root based experiments (Meyer 2000)(Interview with Niels I Meyer 16th December 2014)

The new centre-left government in January 1993 made it possible to fund a number of 'green' initiatives, but not at the same level as before, and not as independent as before. (Interview Niels I Meyer 16th December 2014) This may be related to the change in 1992 where socio-economic calculations became decisive for funding (Interview with Preben Maegaard 11th November 2014). A Green Fund was established, but it did not have a focus on renewable energy. The change of government after the election November 2001 removed most funding for 'green' initiatives and forced many local Environment and Energy Offices to close. (Interview with Ann Vikkelsø 17th October 2014) . There is an eternal quest of finding financing – and this is partly shaping the focus of the work (Interview with Bjarke Rambøll 21st November 2014). Most of the center-left part of the Danish Parliament finds the grass-root activities related to renewable energy important, and have been fighting for a continuous financing – in different shapes. In 2005 it was made possible to fund 'Energitjenesten', but it has never been easy to find the money (Interview with Steen Gade 17th December 2014)

In the early days there were only a few employees, predominantly with masters in engineering. This has changed, more employees are specialists in communication, project management – the engineering part plays a lesser role today (Interview with Bjarke Rambøll 21st November 2014)

Volunteers played an essential role in the organisation, especially in the local environment and energy offices, until the turn of the century. Some people had a life-style with focus on voluntary work, sustaining themselves by a mix of public subsidies and income from small projects – often projects they initiated themselves. However, this type of volunteers is hard to find nowadays (Ann Vikkelsø 17th October 2014).

A new type of volunteers have entered the scene with the project 'Ung Energi': hundreds of young people work with aspects of renewable energy and energy savings. The 'old' are helping them by making office space and facilities available for free (Ann Vikkelsø 17th October 2014).

4.3.4 Monitoring and evaluation

Monitoring is especially important in relation to the projects; VE carries out in the 3rd World, typically funded by Danida. Evaluation of this type of projects is decisive, and VE has learned much about monitoring and evaluation by being part of Danida projects. There is a focus on trying to assess the impact using qualitative studies – in contrast to a simple counting of number of activities, events and artefacts.

VE has not monitored the Danish activities in the same way. However, VE is inspired by the monitoring and evaluation processes in the international projects and are considering to adapt the processes to the type of projects that the organisation carries out in Denmark Interview with Bjarke Rambøll 21st November 2014)

4.4 Other issues about the local initiative

The development of VE can be described as a continuous navigation process. Constantly the organisation has to manoeuvre trying to figure out how it can influence the transformation to a 100 % renewable Denmark in what the organisation finds the best way. It is a constant manoeuvring in relation to other actors; in relation to conflicts; in relation to opportunities and in relation to the development of the energy system.

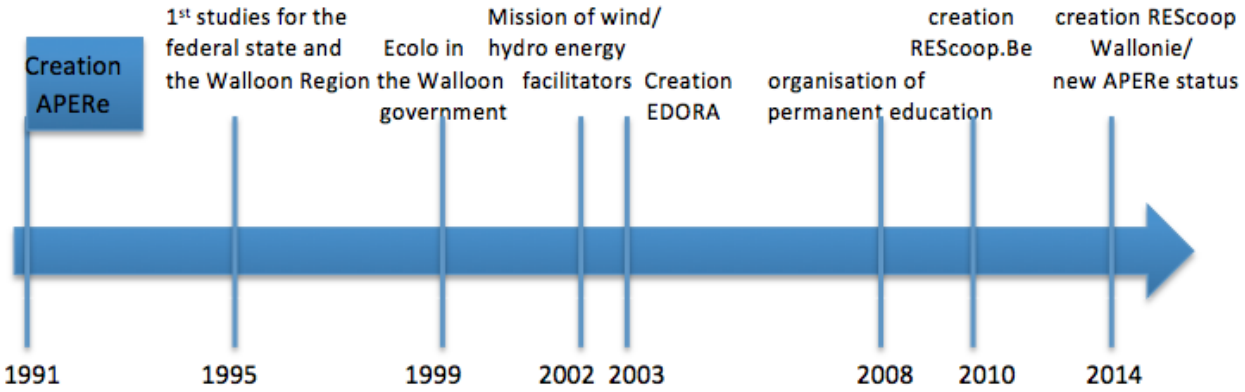
VE has played a central role in relation to the establishment of INFORSE. VE has been socially innovative in several different ways, some of these have become more or less institutionalised, others not. VE is a part of a larger network, not only including other NGOs but also researchers and public centres. VE has played an active part in creating new organisations, expanding the network. Co-evolution is central in relation to understand the development of VE. The larger network can be considered co-evolution across TSIs. There has been a co-evolution of the social innovative network and technology – especially in the first decades of the VE history. There has been a co-development of the TSI and the market – in relation to the development of different ways of organising and financing local renewable energy projects. There has been a co-evolution of the TSI

and the resources, funding the social innovations. There has been a co-evolution of the TSI and scientific knowledge, created in the collaboration between grass roots and researchers.

5 Local initiative 2: *APERe*

5.1 Overview of development in the local initiative

The timeline below illustrates important temporal stages during the life of APERe from its creation in 1991 until now.



The table underneath shows (some) elements of the timeline

Year / period	Important activities/changes/milestones in local manifestation	Important changes in context
1991	Creation of APERe	Facing the oil counter-shock, renewable energy is not considered a rational option for energy production
1995	First financed studies conducted by APERe for the federal state and the Walloon Region	Professionalization of APERe, enlargement of the staff thanks to remuneration of studies
1999-2002	Implementation of the mission of renewable energy facilitators: APERe is mandated by the Walloon Region for the mission of hydro and wind energy facilitators	The ecologist party (Ecolo) gets the Walloon Energy Ministry: energy and renewable energy become a new priority in the regional policy
2003	APERe positions more and more as a neutral expert, lobbying activities are let to other actors (EDORA etc.)	Development of the market of renewable energy and creation of the professional federation of private developers of renewable energy in Wallonia – EDORA
2008	Reinforcement of activities of education and raising-awareness (for the general public, schools, etc.)	Accreditation of APERe as an organisation of permanent education
2010-2014	After 20 years of existence, the participative citizen dimension is more and more visible in the APERe's discourses of energy transition	Creation of REScoop Belgique and Wallonie
2014	Internal change in governance: modification of the APERe's status in favour of a more participative decision-making process	

APERe (*Association pour la Promotion des Energies Renouvelables*) is a Belgian association of social economy[1] created in 1991 with the objective of promoting renewable energy (RE) and rational use of energy (RUE), encompassing energy efficiency and reduction of energy consumption. The organisation was founded during the two-years civil service of a Belgian physicist in a NGO that was active in development cooperation, especially in choices of technology (COTA – *Collectif d'échange pour la Technologie Appropriée*). The objective of the civil service mission was to create a structure under the form of a non-commercial organisation in order to support the development of RE. At the time, RE was not considered a rational option in comparison with other forms of energy. Indeed, at the end of the 80's, the period of the reverse oil shock, the interest for RE has passed away because projects became inadapted to a context of cheap oil (APERe, 2011b). APERe had thus the ambition to restore the credibility of RE and advocate this kind of energy production. The founder of APERe, who became the first General Secretary, explains: "*The choice of the name of APERe was not insignificant : as we were facing different lobbies, we decided to create a kind of lobby, hence the term "promotion" of RE in our name. We had to promote RE because other technics were promoted"*.

The first important event in the life of APERe – just before its official creation – was a conference that the European Commission and the European federation of producers of RE wanted to organise in 1990. With the financial support of the Brussels Minister of energy (Government of the Brussels Region), the founders of APERe in COTA took part in the organisation of this conference and met different actors, including the federation of environmental associations in Wallonia (*Inter-environnement Wallonie*) and Danish activists of the future network Inforse. That was an opportunity to create a first network of people interested in RE in Belgium.

In the very beginning, APERe had been operationally integrated into the associations COTA and *Inter-environnement Wallonie*: COTA needed to act in RE technologies at the level of Northern countries and Inter-environnement Wallonie needed a technical branch to work on RE. After that, APERe became an entirely independent structure. It was composed of various non-commercial members: universities, research centers and non-governmenal organisations.

A turning point in the evolution of the association appeared in 1995, when APERe got financial means from the federal administration to conduct its first concrete project: a study on RE, including an analysis of the concrete potential of RE in Belgium. The APERe's current General Secretary explains : *"from the beginning, our expertise has been appreciated because we gave public authorities studies about the initiatives of several actors in the field of RE. We addressed public authorities by advocating the advantage to anticipate the European objectives of RE. So we proposed our services to anticipate decisions. Our innovation was anticipation. We took the vacant place of experts and consultancy that was free, there were no other actors positioned in this field."* Following this trend, APERe has professionalized thanks to new projects for the Walloon and Brussels Regions and Europe, especially about hydroelectricity and thermic solar energy (i.e. a guide of RE, an inventory of hydroelectric sites, etc.).

A next turning point occurred when the ecologists (the 'Ecolo' political party) arrived in the Walloon government in 1999. Energy policy became a new priority. The current APERe's General Secretary states that *"energy is a very important lever of the political action of Ecolo, so they made*

[1] Social economy is defined by several principles: providing a service with a social purpose, having a management autonomy and a democratic decision-making process, and prioritising people and labour over capital (in terms of income distribution). See also the RIPESS case.

the best use of our expertise. When Ecolo was in power, we did not have to demonstrate the interest of RE, we had just to convince that our ideas were good". Ambitious projects on thermic solar and RUE (for buildings, isolation, etc.) were adopted and APERe conducted a study in partnership with universities on supporting mechanisms for RE (green certificates[2]). In this period, APERe reinforced its role of consultancy agency in RE, mainly (exclusively) for public authorities. This context is marked by the speeding up of APERe's activities and the increasing of the permanent staff. Among the most important developments in this period, the Walloon Region has charged APERe in 2002 with a mission of facilitator for developing wind energy (there were only one or two wind turbines in Wallonia) and (micro) hydro energy (in non-navigable streams). In the framework of this mission, the APERe's staff is supposed to offer an "*objective and scientific information*" to private operators, local authorities and households and support the development of concrete projects. It also provides advice, directly and by developing specific decision-support tools (such as financial simulators), helping local and regional authorities as well as citizens to identify problems and find solutions.

In the meantime, the whole RE sector has professionalized: a Walloon professional federation of renewable electricity producers (EDORA)[3], financed by RE enterprises through membership fees, was created in 2003 thanks to the development of the RE market. It is interesting to note that APERe has contributed to the creation of this federation through a member of the APERe's staff taking the lead and becoming its first General secretary[4] (APERe, 2004). The creation of EDORA is an important step in the building of the landscape of Belgian RE actors and has contributed to better defining roles. Indeed, before the existence of EDORA, APERE was confronted with the difficulty of advising regional authorities and in the same time criticising politics (interview current APERe's General Secretary). There was a problem of taking partisan positions because APERe was mandated by the Walloon Region to fulfill the mission of wind energy facilitator - hence the need to create another structure advocating the interests of the RE private sector. Once EDORA had been built, APERe abandoned lobbying activities to private operators and maintained its networking and consultancy roles: *"We are complementary at the political level: they are free to criticize, whilst we position ourselves as a workshop*." (interview current APERe's General Secretary). The EDORA's first General Secretary (2003-2009) explains the different raisons d'être of both organisations : *"EDORA represents its members and the development of the sector, in order to show the potential of development based on techo-economic considerations.* (…) *The spokesparty that defends an environmental position about the sustainability of RE is rather APERe, not EDORA, even if EDORA can answer to this kind of question. EDORA's members can decide to promote sustainable RE, and that was the case when I was General Secretary, but it is not an obligation. APERe is positioned in the field of social – societal choice.* (…) *APERe does not want to engage in politics* (in terms of political party)*, but to stay a neutral expert. APERe supports a social model aimed at energy transition, without preference for specific actors*". Still, APERe and EDORA, as autonomous and independent structures, interact in various ways. Both organisations are members of each other, and they can collaborate in data collection and analysis to studies (through subcontracting).

Following these evolutions, the APERe staff define themselves more and more as neutral experts delivering objective information: *"We were very activist in the beginning because it was very new*

[2] The system of 'green certificates' was implemented to provide a financial incentive for RE production: the Walloon energy regulator attributes to each RE producer an amount of green certificates which gain a financial value when they are sold. The market of green certificates has been created through the obligation for each energy supplier to get a certain quota of green certificates.

[3] Then EDORA opened to other industries of RE (warming and biomass).

[4] This person had a previous experience in professional federations in other sectors before working in APERe for the mission of wind energy facilitator.

but now our activism is not so much taking place on the ground, through direct action, it is more dedicated to information provision and experience sharing. It is an action within the framework of a mature market" (current APERe's General secretary). Therefore, APERe acts as a network of competences and experiences and proposes its expertise to regional public authorities (Brussels and Wallonia) as well as to professionals and citizens. In 2008, APERe has also been officially recognized by the Federation Wallonia-Brussels as an 'organisation of permanent education'[5]. This status allows them to conduct different campaigns with the related annual public subsidy.

- What are the aims, goals, actors, activities, structures, relations and impacts of the local initiative? Did they change over time? How? Why?

The primary goal of APERe was to give credibility to RE. They saw this confronted by different obstacles such as a lack of technological maturity, an image of RE related to idealism rather than to a rational option for energy production, and economic problems because production of RE electricity was less paid than other forms of electricity production.
More generally, the first General Secretary explains that the creation of APERe was really anchored in the *'questioning of a social model whose limits are well-known'*, hence the need to promote an alternative to fossil fuels (cf. infra, 3.2.2.).

As stated in the documents presenting the organisation, the APERe's rationales of action (see further in section 3.3) are, in the environmental field, reduction of greenhouse gases emissions, reduction of air, water, ground and biosphere pollutions, limitation of accidents, and preservation of the natural resources stocks. Economic arguments are the guarantee of a stable energy price less sensitive to fluctuations in the fossil fuels market, an autonomy and security of energy supply, a reinforcement of local economy by developing small and medium enterprises, and the promotion of short supply chains between producers and consumers. Social goals consist in the creation of sustainable and non-relocatable jobs, a local appropriation of energy resources and productive means through participative projects, and the reduction of international tensions by fostering solidarity between people.

In terms of focus of APERe's activities, APERe is dedicated to promote RE and RUE from the primary viewpoint of RE. The first APERe's General Secretary explains that this choice was made because it was easier to position themselves at the level of energy production than at the level of reduction of energy consumption: "*The discourse on energy production was necessary to be heard, even if the potential of energy savings was more important*. (…) *in the beginning we had to frame ourselves through an ideology that was terribly productivist – this is still the case today at a certain point –where people did not listen to a discourse that was not productivist. We decided to focus on RE production because this was the dimension in which we could better identify the difference in comparison with existing discourses*." His successor, the current APERe's General Secretary pursues: "*communication is easier on RE, we win over the public through a visible thing (a wind turbine for example) rather than through a direct message on RUE which is more abstract and less attractive. The action of producing RE is « sexier » than less consuming. So we raise awareness about what is energy through explaining RE, and then it implies a message on RUE because 100% RE implies energy savings. This is the communicational strategy we adopt in schools: we visualize what is wind and solar energy and from there we explain what is energy, why is it useful and what are impacts, etc.*"

[5] The Federation Wallonie-Bruxelles defines an organisation of permanent education as an organisation that has the objective to develop (mainly in adults) 1) awareness-raising and critical knowledge about society, 2) capacities of analysis, choice, action and evaluation, and 3) attitudes of responsability and active participation in social, economic, cultural and political life.

In line with this strategy, APERe has developed a Charter signed by all members, advocating sustainable energy, i.e. a vision of 100% RE as well as RUE. This Charter was created to specify the social aim of the organisation, because APERe wanted to clarify its definition of RE in a context where everybody developed its own definition. *"We had to define our position because some people considered gas from old coal minings as a RE! There was a confusion between the notions of local energy and renewable energy*", tells the current APERe's General Secretary. In these circumstances, the Charter was initiated to avoid a nonpertinent use of the term «RE» and to establish the APERe's criteria for advocating RE (social, economic and environmental interests of RE). *"For example, if we burn wood without respect to the environment, it is not an initiative to promote*", according to the APERe's General secretary. The Charter also defines RUE and the necessity to acknowledge the technological but also the behavioural aspects of RUE. With regard to the latter, it also addresses the importance of avoiding the rebound effect, i.e. the risk that efficiency gains are offset by increasing consumption, through 'real' energy savings.

APERe's activities continue to evolve. They are composed of 1) education (campaigns, information and trainings); 2) advice/consultancy (missions of facilitator, studies); and 3) networking with members, partners and sympathizers.

Educative projects are diversified and target different publics, for example schools or citizens including underprivileged people. Two campaigns dedicated to the general public are organised each year. These projects are often conducted in partnership with other actors, for instance the national press in the case of the "Energy challenge" competition focusing on households' energy consumption, or the Brussels administration of environment in the case of "Défi énergie école" (aiming at reducing energy consumption in schools).
Information is provided and actively disseminated through a website created in 2000 (containing an agenda of events, a forum, articles and press releases, studies etc.), the APERe's monthly web-journal "Renouvelle" (more or less 8000 readers in 2013), a newsletter and a documentation centre (APERe, 2014). The staff also answers citizens' questions via emails, phone or dialogue face-to- face. Furthermore, APERe is communicating through press releases, and other tools such as "Energizair", a project that provides information on RE in weekly TV weather forecasts, or the "Smartguide", an annual report of the RE sector. APERe has developed partnerships with the specialized press (in the environmental and RE fields) and participates to events such as energy fairs. APERe's visibility in media is important. For giving an idea, APERe appeared in 2013 in 5 TV emissions, in 10 radio emissions and in 70 articles in the written press. Moreover, the organization is addressing Ministers, deputy members and political leaders directly, expressing its viewpoints through memorandums written with its members or partners in the period of federal and regional elections.

In the field of activities of advice, the mission of facilitator for wind energy and hydroelectricity has reorganised. As stated by one of the current staff members, the mission has progressively changed in terms of targets: *"...from providing support to private developers (who have professionalized and are now gathered in the federation EDORA), we have moved to providing support rather to local initiatives, municipalities and citizens. Private developers have now their own tools and lobbying action so we kept the role of providers of expertise which is more factual, this is what we seek to maintain in our mission. We stay in contact with private actors but we have disengaged from doing their advocacy".*
Other services are provided by APERe. For example, the organisation supports since 2012 the different "Maisons de l'énergie" of the Brussels Region (i.e. non-commercial structures advising citizens in order to reduce their energy consumption) by training staff, offering back-office expertise, analysing projects and visiting building sites. APERe also helps local authorities to implement a local energy-climate policy in the framework of the Mayors' Convention.

Furthermore, the organisation operates as an Observatory of RE in Europe and Belgium and is still leading specific studies on behalf of public of private actors.

Regarding networking, APERe is affiliated to around twenty national and international associations and networks, active in the fields of RE, climate change, environment and sustainable development but also of permanent education as well as social enterprise 'incubators' and social economy enterprises (see also the TRANSIT case study on RIPESS). APERe is connecting its members who can take part to information-sharing each week. The organization also monitors and relays the content of other Belgian websites in the field of RE[6]. Material and infrastructure are available to members, such as communicational tools and preferential prices for renting meeting rooms.
Affiliation to the international network Inforse occurred in 1996, in what seemed a "natural" act of adhesion to this European RE federation. APERe gives a moral support to Inforse's objectives and lobbying activities at the European level: "*We support their objectives and we are confident about their actions at the European level*" (current APERe's General Secretary). The Danish model of development of RE, in particular its participative citizen dimension, is also inspiring APERe. However, at the operational level, the partnership between APERe and Inforse is quite weak: as the APERe's domain of activity is often regional in orientation, collaboration with Inforse Europe is limited to information-sharing. The first APERe's General Secretary explains that information delivered by Inforse was very interesting to show that RE worked even if their case studies were not specifically useful to convince the Belgian actors. Furthermore, in the beginning of APERe and Inforse, national RE contexts and objectives were very different between Belgium and Denmark: "*With Inforse we were not at the same level of intervention because Denmark was determined to implement 100% RE*" (1st APERe's General Secretary).

Through its evolution, APERe has become a very institutionalized network, recognized by and interacting with different well-established actors in Europe and Belgium, particularly federal, Walloon and Brussels ministerial cabinets and administrations. This historical trend towards mainstreaming has been directly guided by the strategy of APERe since its beginning – aiming to tie into existing structures and build alliances to advance RE, without specific proximity to any political party (cf. infra 3.3.1.2.). This positioning as a "neutral" and expertise-based actor is very clearly and consistently reflected in APERe's publications and studies (for example through its annual RE guide, statistics, etc.).

5.2 Aspects of 'innovation' and 'change' of the local initiative

5.2.1 Relation with social innovation

According to the current APERe's General Secretary, the association has always been innovative. In the beginning, innovation resided in the novelty and the goals of the association in a context where RE was very marginal in Belgium (less than 1% of energy production):"*we advised the Regions (especially Wallonia), the federal level and Europe and in the same time we initiated new ideas, so we*

[6] such as www.bruxellesrenouvelable.be, www.eolien.be, www.meteorenouvelable.be, etc.

innovated given the fact that there were not other actors (consultancy, research centres) on this subject." (interview current APERe's General Secretary). APERe contributed to set these issues on the agenda, raise awareness about them, and create a network of actors around this alternative kind of energy production. And then, APERe has supported the evolution of RE and RUE and is still launching new ideas in the energy sector. The current General Secretary describes what can be considered a move of institutionalization and upscaling of these innovations through the intervention of regime actors :"*In our development, innovation has always been there because when ideas mature, they are used by regime actors. We have a role of creating things which are then taken further subsequently. This has happened, for example, by the federation EDORA, which has taken up the function of economic lobby, or by public authorities through the creation of the «Maisons de l'énergie» (advice is given to households by public authorities and we are in second line and have a transversal expertise).".* As a rather recent example of what he considers an innovative action in the field of RE and RUE, he mentions APERe's initiative to play into the suddenly looming energy deficit in Belgium, the 'blackout': "*recently we informed our members on the possibility to create an action related to the risk of blackout: we gathered members and we are now building a common campaign at the federal level to mobilize citizens to act and develop a positive mindset about energy savings. This is still innovation because we are able to come up with new solutions in new contexts. Later on, our solutions may then be taken up by other structures, this is the principle of innovation. When we initiate things, they are often captured by other actors, with logics of power behind it. So we always have to keep imagining new things*."

APERe also promotes grassroots social innovations, such as citizens' RE (especially wind energy) cooperatives, which are considered key actors in what they call the 'citizen energy transition' (APERe, 2014c). APERe has been in contact with lots of cooperatives founders in order to get useful information and advice throughout the process of creation. A member of the APERe's staff charged with the mission of wind energy facilitator explains: *"we can support local initiatives from the beginning. For example in the first information meeting organised by the private developer and their consultancy, if some citizens are interested in a participative project we can guide and advise them about the financial model, the legal and technical questions, etc. We bring them in contact with qualified people for the specific issues. It is the same for municipalities that want to be involved in wind energy projects. Local actors know we exist, we listen to their specific questions and we guide them: each case is particular*". However, this support from APERe is only based on existent citizen's dynamics rather than on creating local projects, even if educative and communicative activities of APERe contribute to raising awareness: *"we are not going in the field to create a dynamics : people are creating their dynamics and we help them based on these existent dynamics. But when we are invited to an information meeting organised by a private developer, we present the participative aspects that can be involved in the project. It is not our role to be too proactive, we have to keep a neutral and objective position*".

Furthermore, APERe is in relationship with the Belgian and Walloon federations of RE cooperatives: REScoop.be and REScoop Wallonie. REScoop.be started up at the end of 2010 as a federation of groups and cooperatives of citizens for RE. The goal of the organization is to better advocate citizens' interests in the energy transition. REScoop.be considers that citizens have an interest in having a better control of their future energy supply, in order to take decisions and share the benefits of the energy transition, and therefore it is advantageous for them to invest in production and supply of energy (REScoop.be, 2010). In this sense, a cooperative is considered by REScoop.be as «*the perfect and ideal form of enterprise*» (website REScoop.be). REScoop Wallonie has been created in March 2014 by eight cooperatives and local citizens associations (REScoop Wallonie, 2014). The founding of these Region-specific entities turned out necessary due to cultural differences and interpersonal problems between Flemish and Walloon members as well as institutional difficulties (i.e. the regionalisation/devolution of energy policy, public subsidies and

of specific initiatives[7]). The context was also very different between Flanders, dominated by one major cooperative (Ecopower, gathering more than 35 000 cooperators), and Wallonia, where smaller initiatives were born (in total about 3-4000 cooperators).
The objectives of REScoop Wallonie consist in (i) reinforcing active citizens' participation in the development of RE (in particular wind energy) in order to ensure a public and citizen control on this production and allow an economic return for citizens and the society; (ii) raising awareness of consumers about RUE; (iii) supporting the cooperatives members and local citizens associations; (iv) representing members vis-à-vis political, professional and financial institutions and organisations; and (v) insuring public and mediatic visibility of the association and its members. As a representative of thousands of cooperators and members of local citizen associations, REScoop Wallonie wants to be the spokeperson towards Walloon public authorities.
As APERe has always supported local cooperatives and the idea of a federation of these initiatives, the organisation took a role of mediator for creating REScoop.be to release tensions created by strong personalities inside and between (Flemish and Walloon) cooperatives (interview current APERe's General Secretary). Nevertheless, APERe is not a founding member because it is not a cooperative itself. APERe is particularly close to Rescoop Wallonie, because of their geographical scope, and both organisations are occupied with the formalisation of their interactions: REScoop Wallonie is going to become member of APERe and conversely. They are working together on certain issues, such as those related to citizens acceptation, and have recently asked the Walloon energy ministry a subsidy for creating an interactive map of the Walloon cooperatives on a specific website (interview president of REScoop Wallonie). APERe and a specific wind energy cooperative (*Lucéole*) also organised a field travel in Denmark in 2013 in order to visit Danish cooperatives. The official organisers were APERe and Lucéole with the help of Rescoop. The programme of the trip included visits to Nordic Folkecenter for renewable energy (Hurup Thy), Hantstholm harbour, the wind turbine Tvindkraft (Tvind Ulfborg) and meeting with Thy-Mors Energi, visit of Samso island and meeting with Energi Akademiet, conference of Jens Pouplier – Danish ministry of environment. Furthermore, APERe followed the creation of *Cociter (Comptoir citoyen des énergies*- "citizen energy counter"), an initiative of several Walloon cooperatives to offer cooperatives (members) an electricity supplier (operational since October 2014)[8]. Nevertheless, APERe and REScoop Wallonie's scopes are different : APERe promotes its Charter in a transversal way, in terms of issues (wind energy, hydro, solar etc.) and targets (advice to citizens, municipalities, private operators, public authorities etc.), while REScoop advocates only citizens cooperatives. APERe does not wish taking the place of a structure like REScoop. Rather, they prefer decentralization and multipolarity with different structures that communicate well between them and try to find solutions together (interview current APERe's General Secretary). However, even if APERe seeks to assume a neutral position in multi-lateral discussions (for example with EDORA etc.), APERe and REScoop Wallonie are close in terms of philosophy and vision of energy transition. They both are in favour of decentralized energy production, citizen involvement and the objective of 100% RE[9].

As an other example of social innovation, APERe has implemented in its own office an innovative model of shared installation of photovoltaic panels, undertaken jointly by the tenants of the building (APERe, 2014c). The objective is to develop the idea to produce a turn-key concept, which is reproducible in other buildings.

[7] For example, discussions in 2012 around the creation of a Walloon citizen energy Funds (not yet in office) have pushed the need to identify a professionalized spokesman representing cooperatives at the Walloon scale.

[8] *Cociter* could install its office in the APERe's office (interview president of Rescoop Wallonie, also General administrator of Cociter).

[9] The Charter of APERe and the journal "Renouvelle" are referred in the website of Rescoop Wallonie.

Finally, it can be noted that APERe adopts in its internal governance a participative decision-making process, which is in line with its legal status of a social economy organisation (cf. section 3.3.1.1.). The current General Secretary considers this "*an innovative way of working*".

5.2.2 Relation with system innovation

In the beginning of APERe, there was already an idea of contributing to a "change of societal model" in the energy sector because of the limits of the dominant model, i.e. the use of fossil and fissile fuels. Even if the original scope of the association was technical, this objective grew progressively, as explained by the first APERe's General Secretary "*it has become more and more about models of society* (…) *I think that APERe is becoming an organisation involved with social change, voicing that this social change is necessary and more and more urgent. In the first stage we had to sow the seeds of reflection and alternative, now we arrive at addressing the limits of the whole functioning of human societies. We are confronted with a choice of humanity, we are in a train that is heading towards a brick wall so we have to see if it possible to leave the train, to slow down the train, to change its direction… APERe acts on these dimensions while in the beginning, the question was «only» to consider whether another way would be possible. I come from development cooperation so I was aware of the necessity of a change of society, but we had to put a limit to the goals of APERe.* (…) *If we had to think about the name of APERe today, it could be maybe «association for a sustainable world in its energy dimensions*». As a consequence, APERe now prefers talking about "sustainable" energy rather than solely "renewable" energy (APERe, 2011b), what is visible in its Charter (cf. supra). In this perspective too, APERe organised a conference for its 20th birthday in 2011 entitled "From contribution to transition: renewables beyond energy", where different (non) technical talks were given (for example by a sociologist), including on transition theory and on citizen energy cooperatives.

The proposed alternative advocated by APERe – i.e. the desired transition – is to put the energy services at the heart of reflection, i.e. to consider the access to energy services and the necessity of these services. According to APERe, the idea of making the energy transition towards a system without fossil fuels is "reassuring" because it allows the continuity of energy services that we are used to, or that we pursue (APERe 2013b, p. 6). But this transition implies three kinds of actions: less consumption, better consumption and better production. APERe points out a central question – or a critical limit – of RE: there is only so much territorial space that we may agree to dedicate to energy production. This limitation entails a necessity to consume less energy. In its turn, this reduction of energy consumption requires technological progress in terms of efficient infrastructures (for example passive buildings) and equipment (reducing transfer losses) but also social and behavioural changes, by modifying the demands for energy services. In this regard, APERe is expressing the need of energy sobriety but also the risk of rebound effects. It questions contradictory signals an incentives such as rewarding energy efficiency but in the same time offering cheap energy-guzzling services (such as low-cost flights). This energy transition is thus conceived by APERe not only in its technological dimension but also in its human – behavioural – dimension: "*the energy issue went out of engineers' hands, to become the emblem of a transition that the society will not be able to avoid*" (APERe, 2012, p.16).
In order to implement this transition of the energy system, APERe counts on a favourable policy framework allowing for entrepreneurship: "*If the framework is clear, stable and stimulating, the entrepreneurial spirit will materialize in this direction*" (APERe, 2013e). This bet on entrepreneurship-based solutions may explain why APERe positions itself so closely to regional governments and existing institutional structures, from where it can influence policy-making (cf.

infra 3.3.1.2). In this regard, APERe considers the Belgian policy framework is slowly changing in favour of RE and RUE, with sometimes not enough ambitious commitments, but with practical advances though (APERe, 2014b). Such recent examples are : the reform of the Walloon wind energy institutional framework, the reform of the Walloon Plan of spatial planning, concrete proposals about the energy performance of buildings and sustainable cities, as well as the structuring of the sector (in terms of research, certification, etc.). In the same time, APERe is very critical about some other aspects of the policy framework, in particular the nuclear issue and the lack of proactive solutions and positive vision facing the risk of blackout emerging from the system of big centralised and non-flexible units of energy production (cf. section 3.2.3).

In terms of impacts of APERe's action, APERe considers that its work has had positive results since RE has gained interest from public authorities, citizens and private operators. According to the first APERe's General Secretary, one of their (indirect) successes is the development of the interest in RE. He gives an example of change in energy enterprises: "*when APERe was created there was one person partially charged with RE in Electrabel* (historically, the main national energy supplier) *and another one in Tractebel* (engineering consultancy). *When I left APERe (1998), there were already 4 people in each organisation. We succeeded in showing that it was possible to develop rational RE at the level of electricity producers*".
More precisely, APERe has contributed to build a more favourable framework for RE development. As important steps in the regulatory context, APERe contributed to make adopt a new system of tarification of electricity production (cf. infra, 3.3.1.2.) in 1995. Later, APERe has also supported the elaboration of a new Walloon reference framework for wind energy development (APERe, 2012b), implemented in 2013 and allowing participation of municipalities and citizens in wind energy projects (share up to 24,99% of capital for each). In this regard, the Walloon ministerial cabinet of energy has used information from APERe as a basis to some decisions in the process of reform (cf. infra, 3.3.1.2.).
For celebrating its 20th birthday in 2011, APERe organised a conference in order to assess the progress in RE development and APERe's work. In this regard, APERe considers this evolution to be very encouraging. Tellingly, RE has come to be regarded an "inescapable saver", i.e. a simple matter of economy, after its earlier status of "improbable outsider" (APERe, 2012). According to the organisation, its activities have gone along with this evolution, "*reorienting its course to meet the metamorphoses of the sector*» (APERe, 2011, p.1). It pursues: «*Long gone are the days when talking about RE was like yelling in the desert. Today APERe supports the implementation of renewable technologies and plays an active role in communicating with the general public*». For example, APERe mentions that its work is going to bear fruit given the European target 20/20/20 and its adaptation at the Belgian level (APERe, 2011b, p.4). The current General Secretary summarises the evolution of APERe in these terms: "*in 1991 we said «Do you know RE exists? », in 2001 «RE, it works» and in 2011 «RE contributes to a social and fair economy». Our message is to say: « a society 100% RE, it is possible», this is our Charter*." This 20th birthday conference also offered an occasion to hihlight the initiatives in citizens dynamics, in the field of alternative economy and cooperatives, a dimension to which APERe is very favourable (cf. supra. 3.2.1).
The dimension on which APERe has had less impact is on the trajectory of nuclear power. Even if the anti-nuclear activism is not equally shared at the same level by APERe's founders, the organisation has sided several times – even through legal action in 2010[10] – with other environmental associations to stop nuclear power in Belgium. Their argument has been that it is necessary to stop as soon as possible because of nuclear risks and blockages to investments in RE (APERe, 2013f). Actions are invoking a federal law voted in 2003 to progressively stop nuclear power but that governments have not yet implemented since they postponed the life expectancy of power plants.

[10] The case concerned an appeal for cancellation of an agreement between the Belgian state and the energy producing consortium GDF-Suez for extending the lifetime of old nuclear reactors.

5.2.3 Relation with game-changers

For justifying this transition of the energy system, APERe refers to different structural problems at the local and global levels (APERe 2013b). At the local scale, the organisation mentions the different environmental impacts of the energy chain: (i) chemical or thermic pollution on air, water, soil, biosphere; (ii) physical impacts on landscape as well as noise and vibrations; (iii) health risks; and (iv) room taken up. At the global scale, CO2 emissions (climate change) and risks associated to nuclear power are since the beginning considered key reasons to develop local RE and reduce energy consumption. As other constraints related to fossil fuels they mention the oil peak and the depletion of stocks, the environmental impacts of exploitation, transport and waste, price volatility and financial speculation, and the unequal distribution of risks around production sites, of profit and of climate change impacts.
For all of the above structural problems, APERe stresses the game-changing processes have for current modes of energy consumption and production. Yet next to these rather permanent and slowly developing game-changing processes, they are clearly also responding to relatively incidental 'game-changers' (not literally, and there does not seem to be a common francophone version of the term).
Recently (APERe, 2014b), APERe has considered the global economic crisis as a 'game-changing' factor, crucially reducing the public support to RE development while non-conventional fossil fuels (shale gas) are gaining interest. APERe explains that RE are blamed to increase energy prices, while several studies show the main reason of this phenomenon is rather the European dependence to energy importations.
On the other side, more favourable to their causes seems to be the game-changer that emerged particularly in 2014, namely the looming energy shortage[11] (APERe, 2014d). Unlike dominant framings (largely disseminated in mass media) that convey the fear of blackout, APERe frames this risk as an apparent 'window of opportunity' to initiate various activities, such as awareness raising and rethinking of energy consumption in the framework of the energy transition. More concretely, the initiatives involve experimentation with forms of electrical load-shedding that are voluntary yet coordinated. They are supposed to be win-win solutions, rather than merely constraining measures (APERe, 2014e).

5.2.4 Relation with societal transformation

As RE is now representing 12% of electricity production in Belgium (SPF Economie, 2014), APERe is more and more advocating a message of "100% RE in Belgium in 2050, it is possible". That 12% may seem a long shot away from the target, yet APERe primarily considers how rapidly this share has grown. APERe seems to consider that the development of RE is taking place in a world that is transforming, or has started to transform in several aspects. Considering the trajectory towards the current 12%, the organisation considers the 100% target "*perfectly credible and validated by*

[11] There has always been a risk of blackout in winter because of the lack of flexibility of big centralized units of production but this is acute in winter 2014/2015 because of the stopping of four nuclear reactors, or the half of the nuclear capacity of production in Belgium.

studies from recognized organisations, while it would have been laughable five or ten years ago" (APERe, 2011b, p.5).
As indicated earlier under its views on system innovation, APERe also considers RE development and RUE as a matter of broad societal change. Its aim for sustainable energy is not a matter of transforming just the energy system, but necessarily also involves the many systems of consumption and production that tie into it. APERe also emphasizes that this not, or no longer, a matter of technological restructuring. Instead, they have come to lay greater emphasis on the required re-organization of the way in which 'energy services' are provided and consumed.
So in delivering its more immediate and concrete message of RE and RUE, APERe also tends to promote its broader vision of a transition towards a more responsible, fair and sustainable society, in which social responsibilities and roles are quite different from those predominant in contemporary energy provision .

5.2.5 Relation with narratives of change

As explained earlier (cf. supra 3.2.2), APERe relates to a discourse of energy transition that goes beyond the energy sector and questions more generally our models of society. RE and RUE are considered key dimensions to reach a sustainable development of our societies, implying technological and social changes in the ways producing and consuming energy services. The different game-changers justifying these actions (cf. supra 3.2.3.) are integrated to this general transformative discourse of APERe.
It is striking to see how the core focus on RE and RUE seems to have broadened over time, and has been connected with other narratives of change: the notion of 'energy services', for example, as a way to break away from present governance relations. Also the embrace of social entrepreneurship clearly indicates how APERe is subscribing to voluntarist, entrepreneurial transitions strategies. Finally, APERe has deliberately chosen to present itself and its solution strategies as 'transition-oriented', and as a matter of gradual evolution rather than dramatic revolution. Apart from the energy-specific notions of peak oil and energy security, it also seems that they have developed a vocabulary that rather addresses the broader social and governance aspects of energy transition.

5.3 Aspects of empowerment and disempowerment of the local initiative

5.3.1 Governance

5.3.1.1 Internal governance

Decision making in APERe occurs through a General Assembly and a Board composed of the APERe's members and workers. As an association of social economy and in line with participative

democracy – which is a characteristic of social economy –, APERe has changed its status in 2014 in order to allow workers participating to decisions taken in the General Assembly.

The current internal staff of APERe (2014) is composed of 14 people corresponding to 12,45 full-time jobs, which is a more or less constant number since 2009 but constitutes a great change since 1998 (2 full-time jobs). The number of members has also increased, from 5 in 1991 to 45 in 2014. These are Walloon and Brussels academics (university and research centres), associations, as well as cooperatives and social economy organisations.

5.3.1.2 External governance

Since the beginning, APERe has adopted a strategy of involvement in energy institutions to develop a more favourable framework for RE, but without political affiliation to a specific party: "*in our strategy to restore RE credibility in terms of electricity production, we rapidly built networks of contacts with existing structures, without taking political positions (in terms of political party)*. (…) *In comparison with other European countries, the technical potential of RE in Belgium was particularly weak and the share of nuclear production was particularly high (60%). This was the context in which we took a position, we entered existing structures by modifying a series of parameters but by using the other structures to do that.*" (interview 1st APERe's General Secretary). Following this positioning, APERe participated in the works of the National Committee of energy, a (no longer existing) structure composed of the Minister of Energy, representatives of trade unions and consumers. That was an opportunity for APERe to make alliances with different actors in order to promote RE: "*We rapidly penetrated a system that was quite closed and sclerosed, through the possibility to intervene at the technical levels in the national Committee of energy*." (interview 1st APERe General Secretary). In the same way, APERe was also involved, as a body of technical expertise, in the process of elaboration of the Walloon and Federal Plans for sustainable development. Concretely, this strategy has led to some advancements, e.g. a new regulation in 1995 on energy tarification that is more favourable to RE production. This happened with broad political support, as mentioned above, but with an Environmentalist Party (Ecolo) senator in particular.

The relationship with the Walloon Region started in the very beginning of APERe already, at the occasion of the first seminar organised with European RE actors (cf. supra 3.1.). According to the 1st APERe's General Secretary, the Walloon administration, especially some very motivated civil servants, shared the objective to restore credibility of RE : "*researchers of the Directorate-General Energy and Research were frustrated that RE was no longer considered because of cheap oil*". The civil servant charged with this matter at the Walloon administration confirms the state of inaction in the late 80's : "*It was the moment of the reverse oil shock* (…) *that made RE projects not profitable* (…)*. This was the context when I began in the Walloon administration. In the first 2-3 years (from 1988 to 90,91) I was bored because I had nothing to do. Therefore, I read and learned things about RE but there was almost nothing, and no organisation in this field. Also at the European level, programmes were often about energy savings but not about RE*". The first APERe General Secretary had proposed to this civil servant to become a member of APERe, a proposal the latter turned down for the sake of his independence as a public official (as the administration decides which organisation can benefit subsidies for example) (interview civil servant).
According to the formel civil servant in charge with RE, the Walloon administration appreciates APERe a lot for its competencies, its expertise, the professionalism the organisation has developed, as well as its political neutrality (even if the organisation was "suspected" to have a sympathy for Ecolo). APERe got public contracts for studies, even if other private consultancies also conducted

analyses for the Walloon administrations. These interactions have increased progressively, especially through the mandate to act as facilitor for wind and hydroenergy that APERe has fulfilled since 2002. An advisory board composed of the Walloon administration and the ministerial cabinet meets APERe twice a year in order to assess the work of APERe, and to validate and/or direct the proposals of future activities in accordance with political objectives. The civil servant in charge with RE between 1988 and 2008 considers this collaboration between the Walloon public authorities and APERe a real success: "*One thing we are very proud of and that we developed jointly with APERe (amongst others) is the 'facilitators' arrangement. The cabinet (1999-2004) remarked that there were insufficient human resources in administration, I was the only one. I worked hard, but we do have our limits. In this period, I would have preferred to reinforce the RE team in administration but the hiring process was very difficult, so the cabinet proposed to put in place external facilitators. In the beginning I was opposed to this idea, but in retrospect it has been one of the best ideas* (…)*The facilitator is the partner of administration: we demarcated the general policy principles for the mission, but their liberty for action (their discretion) was quite large. The facilitator is mandated (we had advisory boards, regular reports, etc.) but is more flexible than a civil servant (in terms of working schedules, amongst others).* (…) *We had always interactions and we appreciated the information from the field that the facilitators provided us with. For example in wind energy, we did not think in the beginning about the problems of aviation, etc.* (…) *With all facilitators, we had excellent contact because these were relationships of trust and permanent exchange*". Beyond the professional side, the Walloon civil servant also mentions to have had very good interpersonal relationships with them, and mutual intellectual enrichment.

A former adviser RE in the cabinet of the Minister of energy (2009-2014) shares this point of view, considering APERe a reliable actor providing practical information from the field : "*APERe was a very useful source of information. Comparing to the administration that worked in a regulatory framework, APERe has a contact with field actors and was able to give us information on specific projects (for example about preparatory meetings for wind energy projects that went well or not), in order to identify good practices. We did not use this information to formulate political propositions but for confirming or refining political orientations. For example when we had debates on which kind of cooperatives to support through the revision of the wind energy legal framework, information from APERe was precious*".

Given this situation, we can really establish a relationship of proximity and collaboration between regional authorities and APERe, based on structural interactions (especially through the function of facilitator) and related financial support as well as on more occasional services. Good relationships were facilitated by a certain proximity, or affinity, of objectives in the field of energy production (and consumption), which was especially the case with the Ecolo's offices that shared with APERe a common philosophy of societal model: As explained by an adviser RE in the office of the Minister of energy, 2009-2014. "*The office's ideas were much in line with the model of social change that APERe upheld, because the first priority in the office's objectives was put on energy efficiency and reduction of energy consumption. We know that the primary lever is raising-awareness to change mentalities so we were 100% in favour of APERe's activities. We were conscious about the need to change the model, even if we couldn't pull all levers to do that, so the associations and social organisations that stimulated these societal changes and innovations were generally supported by our office.* (…) *It was clear that APERe had this vision of transition that was in total accordance with the philosophy of the office*" Nevertheless, this close relationship proved subject to change, as these words of the current APERe's General Secretary go to show: "*energy is a very important lever of the political action of Ecolo, so they made the best use of our expertise. When CDH* (the centrist humanist party) *was in power, we had also their confidence. In the new context (with the socialist party in power taking* since summer 2014)*, it is more complex: energy is considered a constraint and not a lever* (i.e. a central element of the model change)*. When Ecolo was in power, we did not have to argue the importance of RE, we had just to convince that our proposals were good and nuance things if necessary. Now our struggle is again focused on advocating the very motivations and grounds for RE, we are very worried about the new Ministry of energy. The priority seems not at all to*

decentralize energy production, it is more a return to a logics of centralisation (to better control energy provision and prices). This is a trend that we see, even if it is still early to articulate a position on this. I don't think that the new government is fostering cooperatives, while we prefer a logic of participation". In other words, these political changes are likely to affect further interactions between APERe and the office. The change is quite likely to be disempowering, even if the General Secretary expressed more a fear than a real observed effect.

Furthermore, APERe is interacting with many other organisations in the field of RE and has even contributed at a certain point to the creation of some of them. Examples are the professional federation EDORA and, to a lesser extent, the federation REScoop Belgique.. Indeed, APERe has been conceived since the beginning as a structure that could engender other structures (interview first APERe's General Secretary). As another example, an indirect effect of one of the first studies of APERe about the potential of hydroelectricity has been the creation of an association of mill owners, by raising awareness during the inventory process.

Besides public administrations and ministerial cabinets, APERe interacts with the public energy regulators too (Brugel in Brussels and *Commission Wallonne Pour l'Energie* (CWaPE) in Wallonia). APERe is consulted by these organisations and provides some services. APERe supplies monthly data on electricity production with photovoltaic panels in Brussels (Brugel, 2011), for example, and has supported Brugel for the certification of Brussels installations in the framework of green certificates (APERe, 2011). The association is also proclaimed as the official point of information for citizens (for instance on the website of Brugel about installing of photovoltaics panels and heat pumps). The CwaPE website also refers to the tools developed by APERe, here for calculating the return of photovoltaic panels.

5.3.2 Social learning

Social learning occurs through all APERe's activities since APERe is in contact with lots of organisations and actors involved in the energy sector.. APERe is getting information from the field and disseminates knowledge to its members, partners and the general public. In fact, one of the main reasons why APERe is appreciated is its capacity to identify and disseminate 'good practices'. Furthermore, the participation of APERe to working groups and projects conducted by different regime or niche actors offer opportunities of social learning processes: providing platforms for social learning, they are pivotal actors within the field or 'ecology of inovations'.

Furthermore, we could say APERe encourages social learning internally through its participative decision-making. As described earlier, its status as a 'social economy' organisation also implies a commitment to 'flat' relations and open exchange between its members. More generally, their decentralized approach to energy transition indicates a commitment to local action, crucially supported by processes of mutual learning.

5.3.3 Resources

The first financial support to APERe from the Brussels and Walloon Regions coincided with the official creation of the organisation, at the occasion of the meeting organised about RE with different European and Belgian actors (cf. supra 3.1.). Then, the studies realized by APERe on behalf of public authorities and access to public subsidies brought in sufficient means to hire

professional staff and progressively, to expand the team, also with the help of public employment aids[12]. The share of sympathizers' membership fees and donations – which can be deducted from taxes (minimum 40 euros of donation) since 2008[13] – is very little in the total budget of APERe[14]. As a consequence, APERe is dependent on resourcing from public actors, whether it is through subsidies or through remunerations for services[15]. The financial autonomy of APERe is thus very low, as explained by the current General Secretary: *"The big difference is that EDORA's budget is composed of members' fees, while our fees amount to less than 1% of our budget. We have no autonomy. Our budget comes from the Walloon Region, the Brussels region, the Federation Wallonie-Brussels and the rest from Europe".* To give a concrete idea, subsidies from Walloon and Brussels public bodies have contributed between 33 and 67% (53% in 2013) to the total budget, and remunerations for consultancy have contributed between 22 and 61% (42% in 2013), the rest consisting in employment aids and donations. APERe thus being dependent on external resources, this situation is not discouraging the APERe's staff to progress, though: conversely, it poses a real incentive to them to propose and launch new projects.

The total revenues have reached an amount of 1 104 376 euros in 2013, which are stable figures since 2010 but in clear augmentation since 2001 (more or less 250 000 euros). This budget is primarily allocated to staff's salaries (65% in 2013), followed by project and functioning expenses.

5.3.4 Monitoring and evaluation

APERe's activities are monitored through the publication of yearly activity reports and the organisation of biennial advisory boards for the mission of wind and hydroenergy facilitator.
Apart from this monitoring following from its legal status, APERe also continuously monitors the energy sector. It does so through its yearly reports on RE, its monthly journal and its activities of networking with different partners. In this regard, APERe also monitors and reflects upon its own position in the field by maintaining relationships with energy actors and interacting with new ones according to the evolution of the sector.

5.4 Other issues about the local initiative

First of all, it should be mentioned how the presumed relation between 'global network' INFORSE and 'local manifestation' proved to be much weaker than the researchers expected beforehand. The relationships between international (here Inforse) and regional networks (here APERe) are questioned because of the different levels of action (European vs local – regional levels) in which these networks are involved. In our case, APERe is interested to re-establish more interactions

[12] The public employement aids – attributed under certain conditions – cover a part of the employee's salary.

[13] Because APERe is recognized since 2008 by the fiscal administration as an institution of "nature conservation and environmental protection".

[14] The number of sympathizers' subscriptions (and thus of membership fees) is decreasing since their journal *Renouvelle* has become freely downloadable at the website of APERe. In 2013, only 32 sympathizers are paying the 35 eur/year membership fee while they were 246 in 2006.

[15] The responsible of RE in the Walloon administration encouraged APERe to respond to calls for tendering rather than counting primarily on public subsidies in order to make them less dependent on political changes.

with Inforse but the form these interactions could take are not clear for the current APERe's General Secretary.
Apart from this reflection, indicating how the researchers came to reconsider their initial ideas about 'local manifestations', the following three case highlights or themes emerged during the research process. As decribed more extensively in the introduction (section 1a), the case is articularly interesting for the aspects of 1) the development of the 'local manifestation' within an ecology of innovations, 2) the mainstreaming processes it underwent and 3) the emphatically socio-technical change process within which this social innovation takes place.

6 Synthesis of case study

An important difference between the two local initiatives is their relation with INFORSE. INFORSE and VE are at some points almost integrated, as Gunnar Boye Olesen (the coordinator for INFORSE Europe) works for both organisations and sometimes finds it hard himself to distinguish between which of his work activities belong to which of the two organisations . This is, for example, the case in the work on the scenarios for 100 % renewable energy within 20, 30 or 40 years (Gunnar Boye Olesen 13th October 2014). The relationship between INFORSE and APERe, on the other hand, turned out to be weaker than expected at the beginning of the case study. Their relationship is based on informal information sharing, for example email correspondence or talking to each other at conferences. Both relationships are quite informal and hard to document but the local initiatives are opposites of each other in their relation to INFORSE. While VE is sometimes hard to separate from INFORSE, APERe and INFORSE are so separated that the challenge is identifying in which way they are related (besides APERe's formal membership of INFORSE). They are related in their goal and visions of energy transitions but their levels of action are very different.

It is hard to establish how the INFORSE network is actually used by its members. The two examples in this case show two very different uses of the network. Because both relationships are hard to pin down due to their informality, and because they are so different in their nature, the comparison in the rest of this synthesis chapter is mainly done between the two local initiatives. In synthesising the case, a number of themes have appeared: organisational history in context, technology focus, new organisations and mainstreaming and institutionalisation. These will all be discussed further in the next sections but are mentioned here briefly.

First of all, a significant difference between the three organisations is the length of the organisations' histories. Certain elements that have influenced the organisations, the reasons for their creation and their direction of development are the time they were operating in, the maturity of renewable energy technologies when they developed the organisations, and the mainstreaming of the renewable energy field. In addition, it is also clear from condensing the timelines, that INFORSE – with its coordinating roots in Denmark, has been influenced by many of the same changes in the political level as VE. This also shows how those two organisations have operated in a similar environment and have been exposed to some of the same challenges at the political level, while the APERe case has been very influenced by the institutional context in Belgium. This will be considered further in the section on Aspect of Innovation and Change, under the heading of institutionalisation.

Also under Aspects of Innovation and Change, is a socio-technical discussion at the level of each of the organisations' technological versus social focus. In the VE case, many of the volunteers in the early days of the organisation were involved in actual technology development. Yet, without the social network in the field, that made it possible for different 'experts' to get in touch with each other and take advantage of each other's knowledge, it has been argued that the Danish wind turbine industry industry would not have started to flourish (Karnøe and Garud 2012). For APERe they started out with a technological focus (although not technology development as such) but have moved towards a more social focus later on. In both of the local initiatives it can be seen how the organisations have fostered new organisations. This will be discussed further in section 6.2.

In the section on Aspects of Empowerment and Disempowerment, four points have been highlighted. Firstly a discussion on mainstreaming in the two cases and the subsequent 're-inventing' the organisation – what may be a reaction to the mainstreaming, trying to be 'de-mainstreamed'. A second point is related to energy savings – a theme which both local initiatives are supporters of but have taken a conscious choice not to focus as much on as introducing renewable energy. However, both VE and APERe have always pushed for energy savings through a discourse on renewable energy as they consider energy savings a necessary condition for achieving 100 % use of renewable energy. Third is external governance in relation to the regional context, and fourth is related to the funding of the organisations. The last three points are all points that relate back to the discussion on mainstreaming, and they have therefore all been included in the theme 'mainstreaming' mentioned above.

6.1 Condensed time-line

Year	INFORSE	VE	APERe	Context (orange: Denmark; green: Belgium; blue: International)
1973				Oil crisis
1975		OVE created		
1977		SEK created as an umbrella for local environment and energy offices		
1985				Danish government decides that Denmark should not have nuclear power
1987				Brundtland Report published
1991			APERe is created	
1992	INFORSE is created (by VE and a number of other NGOs)			
1999				Change of regional governments in Wallonia: the ecologist party constitutes a favourable element in the institutionalization of APERe (creation of the missions of RE facilitators attributes to APERe)
2001				Change of Danish government that results in loss of financial support for many organisations. Both VE and INFORSE lose financial support.
2010		OVE and SEK merge and become VE		

VE was created in 1975 (then named OVE), 16 years before APERe and 17 years before INFORSE. At the time VE was created, technologies related to renewable energy, such as wind turbines for the use of wind energy, were still under development and the members of VE generally were directly involved in some sort of technology development in the area, for example building their own wind turbines. Using the wind energy as an example, we can see how the production of wind turbines gradually went from grass roots demonstration projects to industrial production in SMEs, especially in Denmark. Some of these SMEs are now large multinational companies. At the time

when APERe and INFORSE came into existence, the technology on renewable energy – not only wind energy - was much further in its development, and part of being involved in advocating renewable energy no longer required as much involvement in actually developing the technology but more in convincing a number of stakeholders, including citizens of the technology and educating about climate changes, the limited resources, the benefits of energy autonomy, risks related to nuclear power etc. When APERe was created it was with a focus on promoting renewable energy, convincing people how it would be a rational alternative to conventional forms of energy, for example, through promoting renewable energy technologies.

INFORSE was created by NGOs wanting the energy questions to play a bigger role in an international political context, especially in relation to the emerging discourse about sustainable development. Hence, it was not involved in technological development.
Both of the local initiatives started out with quite a technological focus but have since then moved away from this towards a more social focus, promoting visions of transitions and social changes that exceed the energy sub-system, questioning the modes of consumption etc. Yet, as will be argued in the next section, for the VE case, the social context of the emerging renewable energy field was essential in pushing further the technological development as it brought people together with different skills, that, combined, lay the foundation for the Danish wind turbine development – the development has been described as bricolage by Garud and Karnøe (2003).

For the VE case the Danish (anti) nuclear power history has played a central role in the early days of the organisation. It was, among others, members of the Association against Nuclear Power (OOA) in Denmark that took the initiative to create OVE, and OVE's aim was, in the beginning, to show how Denmark could use alternative sources of energy instead of nuclear power. The nuclear power history of Belgium is very different from the Danish history and therefore has not played the same role in the creation of APERe. The initial founders of APERe did not agree on the issue of nuclear power but today APERe is opposed to the postponing of the lifetime of nuclear reactors.

In this case there are some clear examples of path creation and indeed, the notion of path creation has been used before in analysing the Danish wind turbine cluster (Karnøe and Garud 2012). Path creation implies that actors are able to shape their own path, yet they cannot entirely control it (Garud and Karnøe 2003). It is also influenced by other actors and the path becomes embedded in the paths the other actors are trying to influence, and in turn, the paths begin influencing them in a co-evolution process (ibid.). In all three organisations of this case, it is evident that they have been influenced by and contributed to the larger mainstreaming trend of the renewable energy field. While they have all been interested in getting renewable energy on the agenda, and have undertaken different activities that they saw fit for their aims and goals, such as making scenarios to get the attention of the politicians, they have also become embedded in a broader path toward increasing awareness and use of renewable energy and have moved from being outsiders and in opposition to now being part of a larger trend supporting the increased use of renewables. They may now be seen as 'insiders' and have become increasingly institutionalised through the influence of the paths they have become embedded in – the paths of other NGOs, the path of the political agendas, the paths of technology development etc. The institutionalisation is especially evident in the case of APERe that seems to be an integrated part of the Wallonian government's scheme for promoting renewable energy.

6.2 Aspects of 'innovation' and 'change'

There are certain elements of this case which display clear examples of innovation, yet, the social is sometimes less obvious than identifying the technological innovation. The case in general has a significant technological focus in relation to innovation, as both of the local initiatives have been involved in promoting renewable energy technologies, which at that time were different from the dominating energy technologies. VE has also been involved, in its early days, directly in the technology development. Yet, the role of the social context in this is important, and therefore this case invites to a socio-technical discussion where all three organisations can be seen as mediators linking different parts together, creating an informal network, that may lead to technical innovations. For INFORSE, where it is hard pinning down whether there is actually any innovation going on within the network, this role as a mediator is significant, as it brings organisations together that then run projects and create innovation. A core part of INFORSE's work is providing a public database of the member organisations - hence, organisations in different countries can collaborate without INFORSE knowing. Whether this, then, means that INFORSE is contributing to or participating in social innovation is a question of how social innovation is understood. If being the mediator is enough in creating social innovation, then INFORSE is engaged in this way in innovation. However, that innovation is not just social but also technical in nature as the outcome of some projects can be technology. VE and APERe can also be seen as mediators but whereas it is hard to get to know how much INFORSE has been involved in the projects it has mediated, VE and APERe have both been more directly involved in projects – also in projects related to technical innovations. However, both – maybe especially VE – is reliant on the knowledge exchanges of the internal network and to some extent also the external network, and social learning plays an important role in their work on disseminating knowledge, for example in VE's Youth initiative, UngEnergi. APERe positions itself as an expert in the field, staying the most neutral possible and interacting with all – regime or niche – actors, and, by doing so, is an important vector of social learning.

Generally, the VE case is characterised by an importance of informal networks that has been there throughout the history of the organisation. The impact of the informal networks has changed from being related to developing the renewable energy technology to trying having influence by developing visions of a society based on 100 % renewable energy and to reaching new audiences, such as the younger generations.

Hence, the socio-technical context of the organisations has been important and it is hard separating the socio from the technical. The VE case is a clear example of the two aspects being dependent on each other to make changes and innovations possible.

One of the characteristics of both VE and APERe is that they have been part of creating new organisations, which have taken over some of their original tasks and begun a more or less independent life. VE has been a part of creating INFORSE, the local Environment and Energy Offices, The Risø Wind Turbine Test Centre and other organisations. APERe has closely contributed to the creation of the federation of private developers (EDORA). Both APERe and VE have also been (in)directly involved in creating organisations for wind turbine owners and involved in the creation of cooperatives concerning windpower.

6.3 Aspects of empowerment and disempowerment

A theme which has been mentioned several times throughout this case is mainstreaming. In both Belgium and Denmark the area renewable energy has developed to be a part of the energy sector with several smaller and bigger companies and has in this way become mainstreamed. Thus, the organisations have both experienced a move from being 'outsiders' to now working in a sector that has become more integrated in the political context and 'on the agenda' in both countries. For both organisations this has resulted in a reconsideration of what the organisation is working for and what its role should be in the context. For VE (then OVE), the early work of the organisation was a process of social and technical innovation, the level of social innovation can be argued to have decreased over the years.. Not because the organisation has stopped acting but because the social practices, ideas, models, rules and social relations have changed. This is not the case for APERe, which started later and did not have the same early phase of social and technical innovation. VE's and APERe's discourses refer more and more to a transformational change of 100 % renewable energy *and* energy savings. In addition APERe has also recently started supporting alternative models such as the citizens' cooperatives, and VE is trying to find new ways of re-introducing local renewable energy cooperatives.

Both APERe and VE have been institutionalised and professionalized. APERe was fast in creating formal alliances with strong insiders in the energy sector and public authorities. This has been a precondition for the relative stable funding of APERe. VE has constantly engaged with different public authorities, but has not succeeded in getting the same kind of stable funding as APERe – it is basically dependent on finding suitable projects. VE has become much more open for different kinds of collaborations – for instance with private firms in publically funded projects. Funding, suitable for VE is in the public budget, but VE has to apply for it in competition with others. INFORSE has not been institutionalised in the same way, the organisation is dependent on projects – some of them being projects that VE is involved in. For all three organisations in this case, the question of funding is important. APERe gets a significant share (between 1/3 and 2/3 of the total budget) of its funding from regional public bodies but the rest is based on funding for projects. For VE and INFORSE they are 100 % reliant on funding for projects. Hence, this shapes their activities. Although APERe also needs to apply for funding for projects, they have a relatively stable network of partners they collaborate with and can often build on top of existing projects in applying for funding for projects, which means that they can follow the direction of development they are in, and want to continue with. With INFORSE and VE, financial resources play a significant role in which projects are undertaken. In terms of empowerment and disempowerment, the mainstreaming as well as their well-established links with the regional administration has benefitted APERe as they are able to get support from the government, but for INFORSE and VE the mainstreaming does not seem to have had the same effect. Hence, money plays a huge role in terms of what they can do and what they cannot do.

The regional context is essential in the Belgian case, Belgium being a country with strong, important regions with their own energy policies. In Denmark, regions play a very little role, and VE has addressed the national level. Furthermore, VE has been active on the local level in the first part of (O)VE's history. In a long period of time, most local activities happenedvia the Local Environment and Energy Offices, while (O)VE focussed more on the national (and international) level. In the last decade VE has acted more directly locally via Energitjenesten.

Both APERe and VE support and have worked with energy savings, yet in both cases it has not been the primary focus of the main part of the activities. For APERe the question of energy savings has primarily been an issue of communicational strategy as a large part of the activities related to energy savings have been developed but they have not been clearly communicated. With VE's Energitjenesten we do see a change here. However, it was highlighted in the APERe case that energy savings are not 'sexy' – they are hard to sell, and it has been mentioned by Jørgen Nørgaard that people in OOA wanted to focus on renewable energy and less on energy savings as it would distort the focus and the message. With the mainstreaming of the sector, it may be that there will be more energy saving services or energy efficiency related services such as Energitjenesten. UngEnergi also mainly focuses on how to act sustainably and not so much on the production of renewable energy.

In terms of empowerment and disempowerment, the mainstreaming of the renewable energy field both in Belgium and in Denmark have in some ways empowered the organisations as it has become easier to get their message of using renewable energy across. Yet, with the mainstreaming comes a need to redefine the organisations' roles in the context, they are somewhat disempowered by now being 'one of many' with the same message, and both local initiatives are working to redefine their role so as not to get lost in the mainstreaming of the Danish and Belgian sector. For APERe their redefinition is the aim of their charter. One interesting aspect of this is that both organisations want to reach further than the energy sector – bringing a social aspect into it. VE argues that they want to shape/change the society to become more sustainable. In the interview with Bjarke Rambøll from VE on 21st Nov 2014, he specifically states that VE is trying to define its role in the transition process of the energy sector – not only related to energy and energy supply but also to the transition in resource consumption more generally.

6.4 Other issues

What do we learn about how social innovation interacts with other forms of transformative change from the INFORSE case? INFORSE as a global organisation and the two local initiatives have – in different ways - been involved in transformative changes of the energy sector. The Danish case is covering a period of 40 years and illustrates different kinds of dynamics in the relation between the social innovations, system innovations and societal change. In the early days of the case, creation of informal networks, experiments with new collaborations and new technologies are important for the development, having a very clear socio-technical nature. Networks of actors develop technology and this process is a part of developing the networks, which can be considered an ecology of innovation networks;, a bricolage of distributed agency. The networks have not only been experimenting with new technologies, but also with new ways of organising ownership, new ways of financing, new ways of involving people – which all can be said to be social innovations. Due to the loose, informal structure and the many different actors, it is difficult to identify the exact impact of the different social innovations on the system innovation and societal change. Several people, both inside and outside VE, claim that VE has played a role in relation to the change in the Danish energy system.

The case study also makes it quite clear that funding is a necessity, and funding predominantly are coming from public related agencies, often related to specific projects. It is necessary to find

appropriate funding for the informal environment in order to maintain and develop the networks and support the experiments.

It is interesting to notice that even though the Danish case can be seen as a success story in relation to the change of the Danish energy system, there are still contested areas in relation the transition towards sustainable energy. Different NGOs argue that VE should be more cautious in relation to bio-energy. Others point to the slow pace in which energy savings are introduced. Both the Belgian and the Danish case make it clear that the organisations find it easier to promote renewable energy than altered energy behaviour.

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